WOLLESON

Comparison of
Roof Trusses

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COMPARISON OF ROOF TRUSSES

BY

HERBERT HENRY WOLLESON

THESIS FOR DEGREE OF BACHELOR OF SCIENCE
IN ARCHITECTURAL ENGINEERING

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Herbert Henry Wolleson

ENTITLED Comparison of Roof Trusses

IS APPROVED BY ME AS FULFILLING THIS PART OF THE REQUIREMENTS FOR THE DEGREE

OF Bachelor of Science in Architectural Engineering

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Comparison of Roof Trusses.

Unlike, the subject of bridges, upon the economy and comparison of which so many treatises have been written, the subject of roof trusses has been entirely neglected. So the writer thought it both interesting and perhaps valuable in a practical way to make a study of the more common forms of these structures of medium span, particularly of the Fink type, from the standpoint of economy of metal.

The subject has been found to be a most elaborate one. To study the comparison of trusses intelligently, it was desirable and even necessary to determine the effect of rise, span and spacing of trusses. This made the field for investigation without limits, consequently the subject proper is quite incomplete, in fact more time was spent upon the study of pitch, span, and spacing of trusses than upon the comparison.

Having considered only the weights

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of trusses, such important considerations as the rafter span and spacing, the increased cost of roof covering for increased pitch, and the cost of erection, have only been noted, no attempt having been made to enter upon that phase of the problem.

The trusses considered are supposed to be resting on the wall, not being fastened directly to columns, as in typical mill building construction, in which case the columns would have had to be investigated jointly with the trusses.

The following have been the trusses included in the investigation, the numbers referring to the pages upon which the complete data for each particular truss is to be found:—

18 to 26	-	Fink	truss	-	pitch 1/5	-	span 60	-	spacing 10 to 24
26 to 35	-	"	"	"	1/4	-	" 60	-	" 8 to 24
35 to 43	-	"	"	-	" 1/3	-	" 60	-	" 10 to 24
43	-	"	"	-	" 1/4	-	" 15	-	" 14
44	-	"	"	-	" 1/4	-	" 30	-	" 14
45	-	"	"	-	" 1/4	-	" 45	-	" 14
46	-	Pratt	"	-	" 1/4	-	" 60	-	" 14

47-Pratt truss, rise in lower chord 3 ft.
pitch 1/4; span 60; spacing 14
48-Howe truss - " 1/4 - " 60 - " 14
49-Fink truss, rise in lower chord 2 ft.
pitch 1/4 - span 60 - spacing 14
50-Fink truss, rise in lower chord 3 ft.
pitch 1/3 - span 60 - spacing 14
51- truss - " 1/4 - " 45 - " 14

The investigation will include:-

a) comparison of trusses as to rise (span and spacing constant)

b) comparison of trusses as to span (pitch and spacing constant)

c) comparison as to spacing c/c trusses (rise and span constant)

d) effect of raising and inclining the lower chord

e) comparison of the three ordinary types of trusses:- Fink, Pratt and Howe.

Designing.

Specifications. Fowler's "General Specifications for Steel Roofs and Buildings" have been used as a guide in the designing of trusses. The more important clauses, which governed the design will be quoted from time to time as is deemed expedient.

Roof Covering. Black corrugated iron was selected as the roof covering. Because of its durability it has gained the favor of builders to such an extent, that it is almost exclusively used for factory and shop buildings, not only as a roof covering, but as siding also. Generally it is laid directly on the purlins, to which it is held by means of

a hoop iron clip, about 3/4 of an inch in width and 1 1/8 inches in thickness, passed underneath and fastened on each side by a 3/8 inch rivet.

Corrugated iron comes in large

sheets and is easily laid. When laid on tarred paper and with a lap of 6 inches, it is very effective in keeping out moisture. Black instead of corrugated iron will be used, since the cost of the latter is about 175 per cent of the former and its only advantage being that painting will not be necessary for the first five or six years, whereas black corrugated iron would have to be painted three times during that period.

Sheathing. Number 24 corrugated iron, weighing 1.3 pounds per square foot, will be laid on 1 inch by 5 inches pine board sheathing.

Rafters. Rafters are to be of 2 inches by 4 inches long leaf yellow pine, spaced as required by the load to be carried. In calculations,

S = 1200 pounds per square inch

w = weight in pounds per cubic foot = 32.

For the trusses investigated it was determined that 18 inches spacing center to center of rafters, was the con-

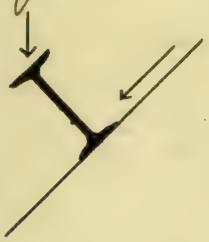
rect one for all pitches — 1/3, 1/4, and 1/5.

Purlins. Practice varies greatly in regard to purlins. Angle, channel, I-beam, Z-bar, and trussed purlins all have their advantages and are often used indiscriminately, without regard to span, connections, or flexture.

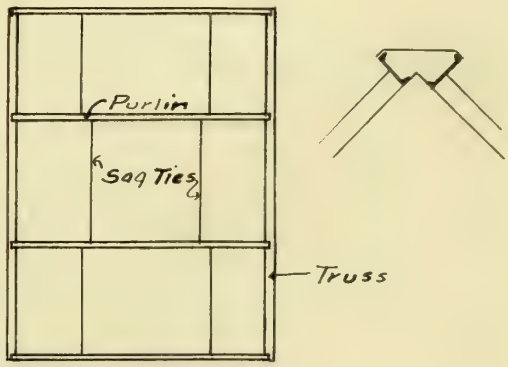
Channel purlins are the most economical of the beam purlins, but allow only one rivet at each end with the ordinary width of upper chord, so I-beam purlins are to be preferred where full panel loads are to be carried and channel purlins where but one-half panel loads are to be sustained. The depth of purlins remains constant for each particular truss. Trussed purlin beams, have not been considered, since they could hardly have been of any advantage. Although saving in material, they cannot be economical when used for short spans, because of the additional riveting, punching, bending, etc.

In figuring purlins, the load consisted of the combined snow, wind,

and roof covering panel loads. The wind load was computed with the wind blowing normal to the roof surface, but in making use of it in obtaining the size of purlins, it was considered as a vertical force. The computations on pages 10 and 11 show this.



The component of the entire vertical load, parallel to the roof surface, will be taken care of by sag ties, which connect the purlins, as shown in the figure. These sag ties have not been computed, as the increased weight would be insignificant as compared to the truss weights and is neglected.



<u>Trusses</u>. Trusses were figured for maximum dead and live load, that is considering snow and dead load on both sides of the roof, with the maximum wind blowing on the other side.

Snow and wind load values were used as given by Fowler.

Snow Load (in pounds per horizontal square foot.)

	PITCH		
	1/3	1/4	1/5
Central States	7	15	22

Wind Load (in pounds).

Pitch	V	H	N
1/3 = 33°41′	17	12	22
1/4 = 26°34′	15	8	18
1/5 = 21°48′	13	6	15

Truss weights were obtained from Professor Ketchum's formula:-

$$W = \frac{P}{45} AL\left(1 + \frac{L}{5\sqrt{A}}\right)$$ where

W = weight of truss in pounds
A = spacing c/c trusses in feet
L = span of truss in feet
P = horizontal projection in pounds per square foot, for which trusses were figured.

The dead load was actually computed.

The value of P, according to Fowler should never be less than thirty. In the trusses investigated, weights were taken directly from a diagram, which

showed the values by means of plotted curves, given by the above formula, using 40 pounds as the value for P.

The method of calculating stresses by means of maximum dead and live loads, is the one generally used in practice. The results obtained, however, are excessive, since the conditions of maximum snow and wind loadings at any one time are never obtained. Furthermore the values given by Fowler for snow weights for the Central States are too large, since loose snow weighs but three pounds per cubic foot, and a depth of three feet is rare.

The values for wind pressure are those given by Hutton's formula:-

$$P_n = P \sin\alpha^{1.842\cos\alpha - 1}$$

The following tables give the data by which the panel loads were obtained, also the coefficients for the various trusses.

Data by which panel loads were obtained.

Trusses of 60 ft. span and 12 ft. rise.

	SPACING							
	10	12	14	16	18	20	22	24
Inclined Area per panel	81	97	113	129	145	162	178	194
Purlin Load at 40.91# per sq. ft.*	3314	3968	4623	5277	5932	6627	7282	7936
Size I Beam Purlin	4"-8½*	5"-9¾*	6"-12¼	7"-15*	7"-15*	8"-18*	8"-20¼	9"-21
Snow Load	1650	1980	2310	2640	2970	3300	3630	3960
Roof Cov. + Purlin Wt. Load	530	635	740	845	955	1060	1165	1270
1/8 Truss Weight (capacity 40)	315	350	390	425	450	490	520	552
Total Vertical Load = P	2495	2965	3440	3910	4375	4850	5315	5782
Wind Load at 15# normal = W	1215	1455	1695	1935	2175	2430	2670	2910

* 2"x4" rafters, 18" c/c	1.19
1" Sheathing	3.00
#24 Corrugated Iron	1.30
Wind at 15# normal	15.00
Snow at 22# horizontal	20.42
	40.91#

Data for trusses of 60 ft. span and 15 ft. rise.

	SPACING								
	8	10	12	14	16	18	20	22	24
Inclined area per panel	67	84	102	118	134	151	168	185	202
Purlin Load at 36.9# per sq. ft.*	2473	3100	3764	4355	4945	5472	6200	6827	7454
Size I Beam Purlin	4"-7½*	4"-7½	5"-9¾	6"-12¼	6"-14¾	7"-15	8"-18	8"-18	9"-21
Snow Load	900	1125	1350	1575	1800	2025	2250	2475	2700
Roof Cov. + Purlin Wt. Load	428	546	680	825	975	1100	1285	1415	1615
1/8 Truss Wt. (capacity 37)	258	290	330	365	395	425	455	485	510
Total Vertical Load = P	1586	1960	2360	2765	3170	3550	3990	4375	4825
Wind Load at 18# normal = W	1210	1510	1835	2125	2415	2720	3025	3330	3635

* 2"x4" Rafters, 18" c/c	1.18
1" Sheathing	3.00
#24 Corrugated Iron	1.30
Wind at 18# normal	18.00
Snow at 15# horizontal	13.42
	36.90#

Data by which panel loads were obtained. Trusses of 60ft span and 20ft. rise.

	SPACING							
	10	12	14	16	18	20	22	24
Inclined area per panel.	90	108	126	144	162	180	198	216
Purlin Load at 33.31# per sq. ft.*	3000	3600	4200	4800	5400	6000	6600	7200
Size I Beam Purlin	4"-7½#	5"-9¾#	6"-12¼#	6"-14¾	7"-15#	8"-18#	8"-18	9"-21#
Snow Load	525	630	735	840	945	1050	1155	1260
Roof Cov. + Purlin Wt. Load	623	710	862	1025	1160	1350	1480	1690
1/8 Truss Weight (capacity 40)	315	353	388	425	450	488	521	552
Total Vertical Load = P	1463	1693	1985	2290	2555	2888	3156	3502
Wind Load at 22# normal = W	1980	2380	2770	3170	3570	3960	4360	4750

* 2"X4" rafters, 18" c/c 1.18

1" Sheathing 3.00

#24 Corrugated Iron 1.30

Wind at 22# normal 22.00

Snow at 7# horizontal 5.83

33.31#

Data for 1/4 pitch trusses of various spans. Spacing 14ft.

	Span 15 Rise 3¾	Span 30 Rise 7½	Span 45 Rise 11¼
Inclined area per panel.	118	118	118
Purlin Load at 36.9# (see page 15)	4355	4355	4355
Size I Beam Purlin	5"-6½# [5	6"-12¼#	6"-12¼#
Snow Load	1583	1583	1583
Roof Cov. + Purlin Wt. Load	920	818	818
1/8 Truss Weight (capacity 40)	200	250	315
Total Vertical Load = P	2703	2650	2716
Wind Load at 18# normal = W	2125	2125	2125

Coefficients to nearest tenths, by which stresses were calculated.

		Y1	Y2	Y3	Y4	Y5	Y6	Y7	X1	X2	X3	X4	X5	X6	X7	1-2	2-3	3-4	4-5	5-6	4-7	7-6	8-7
SPAN 60 RISE 12 FINK TRUSS Nos 18 to 26	P	9.4	9.1			8.7	8.3		8.8		7.5				5.0	.9	1.3	1.9	1.3 ~~2.5~~	.9	2.5	3.8	
	W	5.7	5.7			5.7	5.7		6.2		4.8				2.2	1.0	1.3	2.0	1.3	1.0	2.7	4.0	
FINK. 26 to 35	P	7.8	7.4			6.9	5.8		7.0		6.0				4.0	.9	1.0	1.8	1.0	.9	2.0	3.0	
	W	4.5	4.5			4.5	4.5		5.1		3.9				1.7	1.0	1.1	2.0	1.1	1.0	2.2	3.3	
FINK 35 to 43	P	6.3	5.8			5.2	4.7		5.3		4.5				3.0	.8	.8	1.7	.8	.8	1.5	2.3	
	W	3.1	3.1			3.1	3.1		3.7		2.8				1.0	1.0	.9	2.0	.9	1.0	1.8	2.7	
FINK 50	P	8.2	7.6			7.1	6.6		6.9		5.9				3.6	.8	1.0	1.7	1.0	.8	3.6	2.7	
	W	4.4	4.4			4.4	4.4		4.9		3.7				1.2	1.0	1.2	2.0	1.2	1.0	3.8	2.7	
FINK 49	P	10.1	9.6			9.2	8.8		12.1		7.8				4.6	.9	1.3	1.8	1.3	.9	1.3	4.8	
	W	6.1	6.1			6.1	6.1		6.5		5.1				1.9	1.0	1.5	2.0	1.5	1.0	1.5	3.2	
SPAN 30 RISE 7 1/2 44	P	3.3	2.9						3.0		2.0					.9	1.0						
	W	1.8	1.8						1.9		.8					1.0	1.1						
SPAN 60 RISE 20 48	P	7.8		6.7		5.6		4.5	7.0	7.0		6.0		5.0			1.1	.5	1.4	1.0		1.8	3.0
	W	4.5		3.8		3.1		2.3	4.8	4.8		4.0		2.9			1.3	.6	1.6	1.1		2.0	1.7
SPAN 45 RISE 11 1/4 51	P	5.6	5.2		3.9				5.0		4.0		3.1			.9	1.0	1.3	1.4				
	W	3.2	3.2		2.2				3.5		2.4		1.3			1.0	1.1	1.5	1.4				
SPAN 60 RISE 20 46	P	7.8	7.8		6.7		5.6		7.0		6.0		5.0		4.0	1.0	1.4	1.5	1.8	2.0		2.2	
	W	4.5	5.0		4.2		3.5		5.0		3.9		2.8		1.7	1.1	1.6	1.7	2.0	2.2		2.5	
Pratt 47	P	9.9	9.9		8.4		7.0		8.9		7.6		6.3		5.1	1.0	1.8	1.5	2.1	2.0		2.4	1.0
	W	11.5	12.5 +		10.5		8.4		12.4		9.7		6.9		4.2	2.2	3.6	3.3	4.5	4.5		5.5	.8
SPAN 15 RISE 3 3/4 43	P	1.1							1.0														
	W	.4							.6														
SPAN 45 RISE 11 1/4 45	P	5.6	4.5	4.7					5.0			3.0				1.1	1.1	2.0					
	W	3.2	2.5	3.2					3.8			1.3				1.1	1.2	2.3					

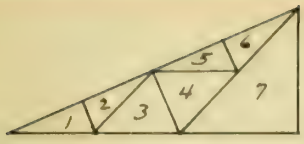
Designing of Members. Angles were used entirely in the designing of members, the sizes being selected from a list which represents those angles which are rolled continually and can be most easily obtained. The list comprises the following:-

2X2	3½ X 3	5X3½
2½X2½	4X3	5X4
3X2	4X3½	6X3½
3X2½	4X4	6X4
3X3	5X3	6X6

3½X2½ (¼ inch thickness only.)

Fowler permits of no angle less than one quarter inch thick, or of less than two inch leg.

Likewise in §39, he specifies that all main members shall preferably be made of two angles placed back to back. Chord sections were always made of two angles, and such other members, where the substitution of two angles for one did not increase the weight of the member more than seven or eight per cent. In best practice, such members as 4-7 and 6-7 in the Flink



truss and all the struts in the Pratt truss would be considered as main members. This would surely be true in roofs for mill buildings where reversals of stress often occur.

In designing compression members the following column formula (Fowler's) was used:-

$$12500 - 500\frac{l}{r}, \text{ where}$$

l = length in feet c/c connections
r = least radius of gyration in inches.

The least width was not permitted to be less than 1/50 of the length except where the unit stress was greatly reduced.

A working stress of 15000# was used for tension members and deductions made for rivet holes, diameter of hole being considered 1/8" larger than diameter of rivet.

<u>Rivets</u>. 3/4 inch rivets were used in all chord sections, except for two inch angle chord sections, where 5/8 inch rivets were the maximum size allowed. 5/8" inch rivets were used in all interior members.

Rivets, spaced three to four feet, with washers were used for stiffening

two angles placed back to back.

A shearing stress of 10000, and a bearing stress of 20000 pounds per square inch was used for shop rivets, with two-thirds those values for field rivets.

The pitch of rivets was taken as 2½ and 3 inches respectively for ⅝ and ¾ inch rivets.

Gusset Plates. All gusset plates are ⅜ inches in thickness.

Bearing Plates. Bearing or bed plates were designed to distribute the pressure at 300 pounds per square inch, are ½ inch thick and provided with at least two anchor bolts built into the masonry.

Rollers. Rollers were not considered necessary for spans of 60 feet or less.

Weights The weights of main-members was computed by finding

the weight of the separate members c/c connections.

The following trusses were drawn to scale and the weights computed from the drawings:— numbers 21, 27, 40, 46 and 48.

Knowing the weight, in per cents, of these trusses, the weight of details in the remaining trusses could be closely approximated. Thus, in trusses with inclined lower chords, in which there are exceedingly heavy stresses, it was estimated that the percentage of details was about 20. The following are the percentages adopted:—

truss number	18 to 26 - 20% -	no. 21	computed at	20½%
"	"	26 to 35 - 14% -	" 27	"	" 13½%
"	"	35 to 43 - 14% -	" 39	"	" 13½%
"	"	43 to 46 - 14%			
"	"	46 - 20%			
"	"	46 - 16½% - computed			
"	"	48 - 20%			
"	"	48 - 16% - computed			
"	"	50 - 18%			
"	"	51 - 14%			

The foregoing values may be somewhat in error, but will not cause any material difference in the final results. An error of five per cent, which is improbable, would in most cases, involve less than 100 pounds.

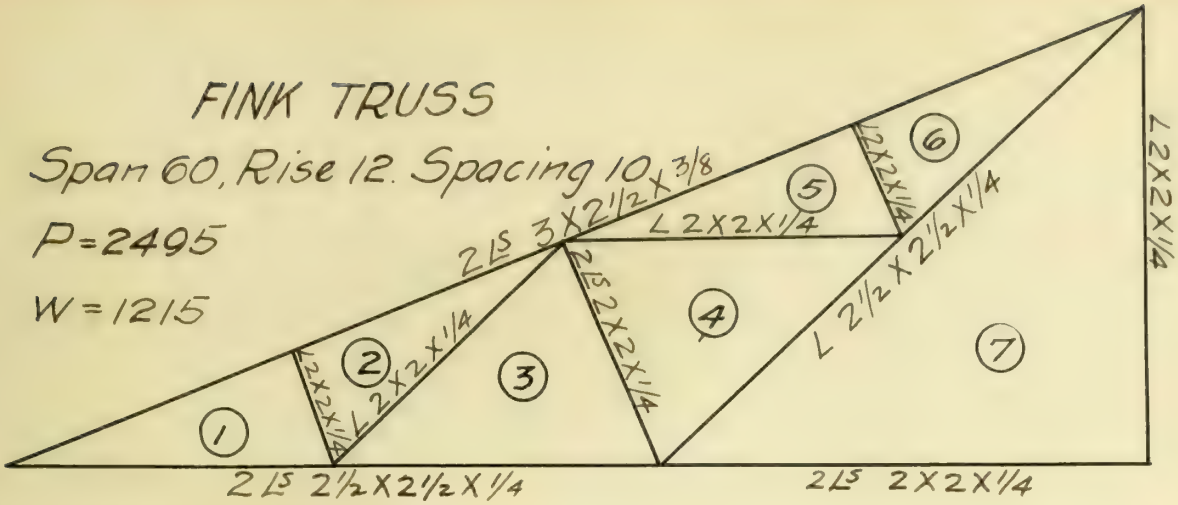
On the following pages is given the complete data for each truss — the size and length of the members, the maximum stress, and the computed weight. The final results are also given, both the truss weight and combined truss and purlin weight.

FINK TRUSS

Span 60, Rise 12. Spacing 10

P = 2495

W = 1215



Member	Stress	l	r	S	Area Required	Area Actual	w	No. of Pieces	Weight
Y1	+30375	8.08	.93	8155	3.73	3.84	6.5	4	210.1
Y2	29630	8.08	.93	8155		3.84	6.5	4	210.1
Y5	28405	8.08	.93	8155		3.84	6.5	4	210.1
Y6	27635	8.08	.93	8155		3.84	6.5	4	210.1
X1	29485	8.70		15000	1.96	1.94	4.0	4	139.2
X3	24540	8.70		15000		1.94	4.0	4	139.2
X7	15150	25.20		15000	1.01	1.50	3.19	2	160.8
1-2	3460	3.23	.39	8360	.42	.94	3.19	2	20.6
5-6	3460	3.23	.39	8360	.42	.94	3.19	2	20.6
3-4	7170	6.40	.61	7205	1.00	1.88	3.19	4	82.4
2-3	4825	8.70		15000	.32	.75	3.19	2	55.5
4-5	4825	8.70		15000	.32	.75	3.19	2	55.5
4-7	9520	8.70		15000	.64	1.00	4.0	2	69.6
6-7	14340	8.70		15000	.96	1.00	4.0	2	69.6
7-7'		12.00					3.19	1	38.3
				Weight of Main Members					1691.3
				Details 20%					338.3
				Total Truss Weight					2029.6

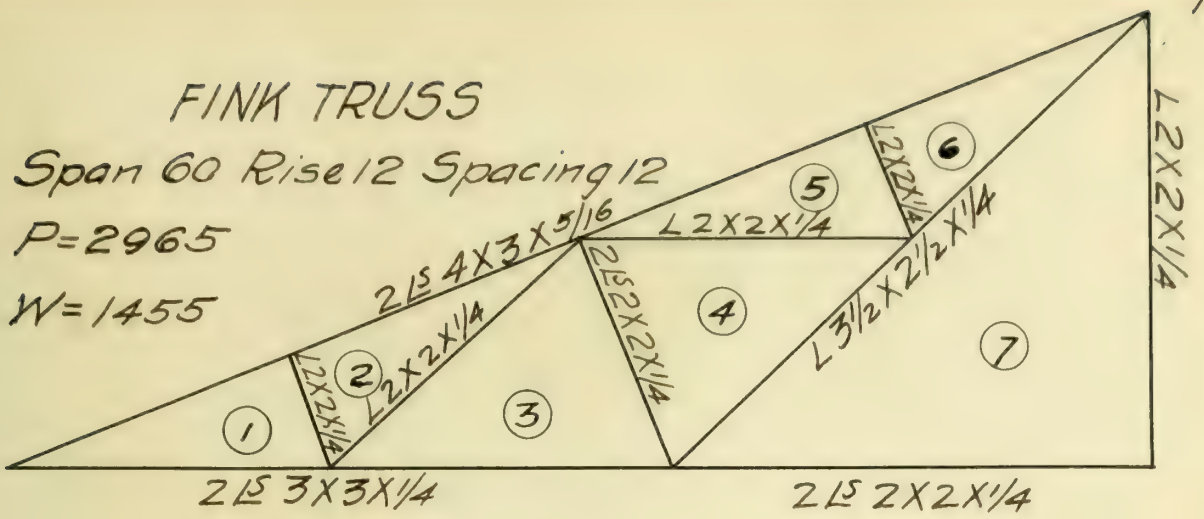
Size Purlins	No.	Length	Wt. per Foot	Weight	
4"-8.5# I Beams	6	10	8.50	510	
4" Channels	4	10	5.25	210	
			Purlin Weight		720.0
			Combined Truss and Purlin Wt.		2749.6

FINK TRUSS

Span 60 Rise 12 Spacing 12

P = 2965

W = 1455



Member	Stress	l	r	S	Area Required	Area Actual	W	No. of Pieces	Weight
Y1	36165	8.08	1.27	9320	3.69	4.18	7.1	4	229.4
Y2	34275	8.08	1.27	9320		4.18	7.1	4	229.4
Y5	33825	8.08	1.27	9320		4.18	7.1	4	229.4
Y6	32955	8.08	1.27	9320		4.18	7.1	4	229.4
X1	35115	8.70		15000	2.34	2.44	4.9	4	170.5
X3	29225	8.70		15000		2.44	4.9	4	170.5
X7	18025	25.20		15000	1.21	1.50	3.19	2	160.8
1-2	4125	3.23	.39	8360	.50	.94	3.19	2	20.6
5-6	4125	3.23	.39	8360	.50	.94	3.19	2	20.6
3-4	8545	6.46	.60	7205	1.20	1.50	3.19	4	82.4
2-3	5745	8.70		15000	.39	.75	3.19	2	55.5
4-5	5745	8.70		15000	.39	.75	3.19	2	55.5
4-7	11340	8.70		15000	.76	1.25	4.90	2	85.3
6-7	17085	8.70		15000	1.13	1.25	4.90	2	85.3
7-7'		12.00					3.19	1	38.3
							Weight of Main Members		1862.9
							Details - 20%		372.6
							Total Truss Weight		2235.5

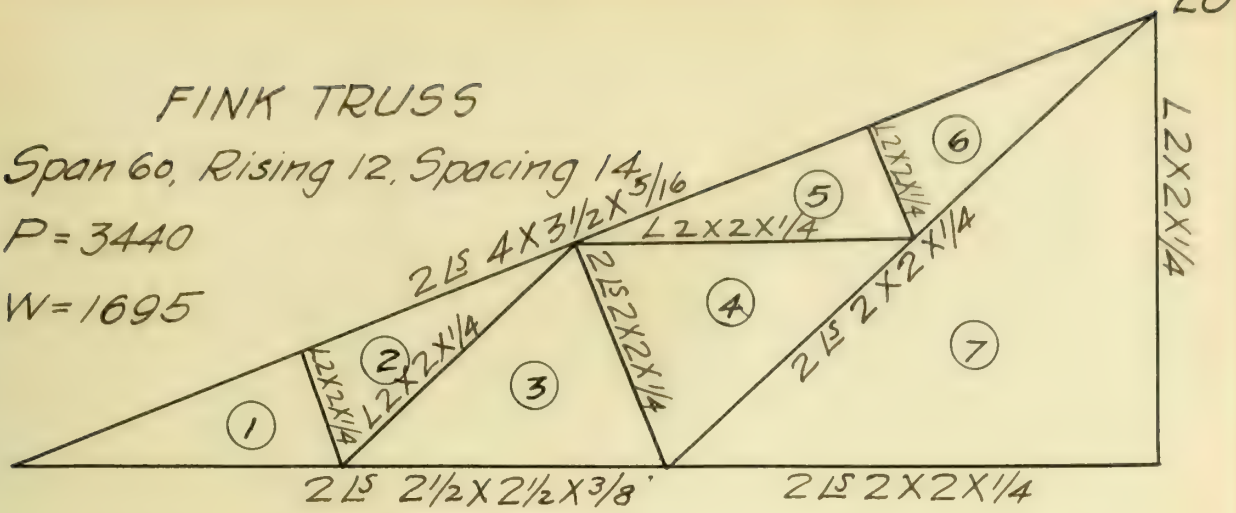
Size Purlins	No.	Length	Wt. per Foot	Weight	
5" I Beam	6	12	9.75	702.0	
5" Channel	4	12	6.50	312.0	
			Purlin Weight		1014.0
			Combined Truss and Purlin Wt.		3249.5

FINK TRUSS

Span 60, Rising 12, Spacing 14

P = 3440

W = 1695



Member	Stress	l	r	S	Area Required	Area Actual	w	No. of Pieces	Weight
Y1	41995	8.08	1.26	9295	4.52	4.50	7.6	4	245.6
Y2	40960	8.08	1.26	9295		4.50	7.6	4	245.6
Y5	39280	8.08	1.26	9295		4.50	7.6	4	245.6
Y6	38210	8.08	126	9295		4.50	7.6	4	245.6
X1	40780	8.70		15000	2.72	2.80	5.9	4	205.3
X3	33935	8.70		15000		2.80	5.9	4	205.3
X7	20930	2.520		15000	1.39	1.50	3.19	2	160.8
1-2	4705	3.23	.39	8360	.56	.94	3.19	2	20.6
5-6	4705	3.23	.39	8360	.56	.94	3.19	2	20.6
3-4	9925	6.46	.77	7205	1.38	1.88	3.19	4	82.4
2-3	6675	8.70		15000	.45	.75	3.19	2	55.5
4-5	6675	8.70		15000	.45	.75	3.19	2	55.5
4-7	13180	8.70		15000	.88	1.50	3.19	4	110.0
6-7	19850	8.70		15000	1.33	1.50	3.19	4	110.0
7-7'		12.00					3.19	1	38.3
Weight of Main Members									2046.7
Details 20%									409.3
Total Truss Weight									2456.0

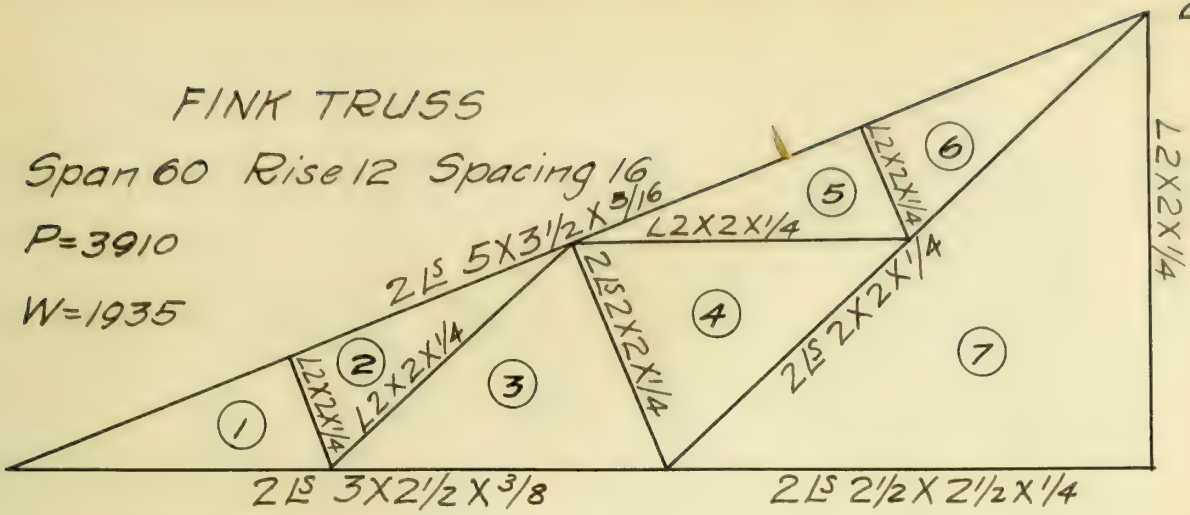
Size Purlin	No.	Length	Wt. per Foot	Weight	
6" I Beam	6	14	12.25	1029	
6" Channel	4	14	8.00	448	
Purlin Weight					1477.0
Combined Truss and Purlin Wt.					3933.0

FINK TRUSS

Span 60 Rise 12 Spacing 16

P=3910

W=1935



Member	Stress	l	r	S	Area Required	Area Actual	w	No. of Pieces	Weight
Y1	47785	8.08	1.45	9715	4.92	5.12	8.7	4	281.2
Y2	46610	8.08	1.45	9715		5.12	8.7	4	281.2
Y5	44695	8.08	1.45	9715		5.12	8.7	4	281.2
Y6	43485	8.08	1.45	9715		5.12	8.7	4	281.2
X1	46405	8.70		15000	3.09	3.18	6.5	4	226.2
X3	37620	8.70		15000		3.18	6.5	4	226.2
X7	23810	25.20		15000	1.59	1.94	4.0	2	201.6
1-2	5455	3.23	.39	8360	.65	.94	3.19	2	20.6
5-6	5455	3.23	.39	8360	.65	.94	3.19	2	20.6
3-4	11300	6.46	.61	7205	1.57	1.88	3.19	4	82.4
2-3	7600	8.70		15000	.51	.75	3.19	2	55.5
4-5	7600	8.70		15000	.51	.75	3.19	2	55.5
4-7	15000	8.70		15000	1.00	1.50	3.19	4	111.0
6-7	22600	8.70		15000	1.51	1.50	3.19	4	111.0
7-7'		12.00					3.19	1	38.3
Weight of Main Members									2273.7
Details - 20%									454.7
Total Truss Weight									2728.4

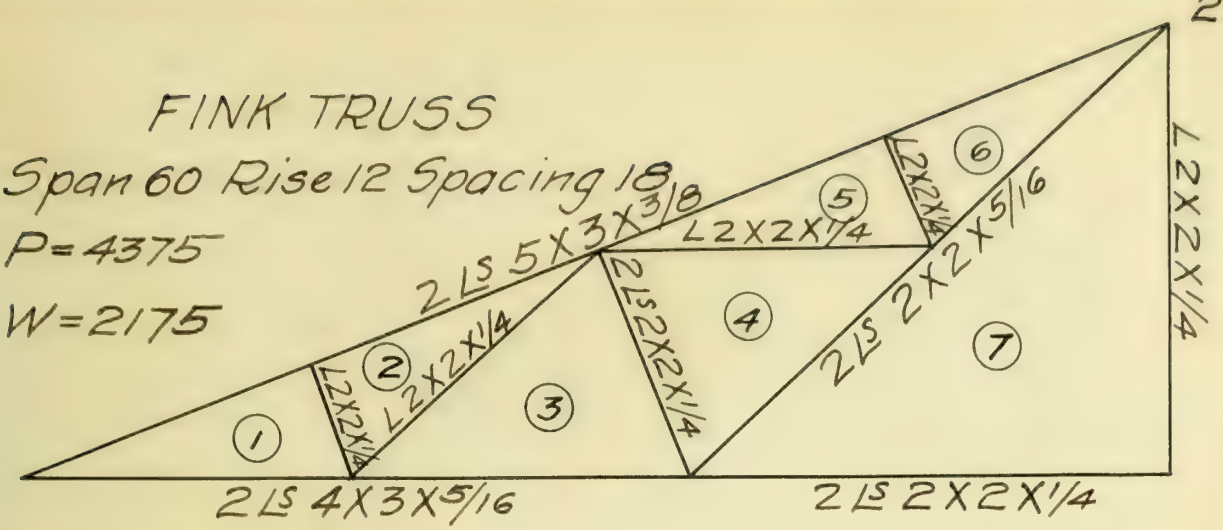
Size Purlin	No.	Length	Wt. per Foot	Weight	
6" I Beam	6	16	14.75	1416	
6" Channel	4	16	8.00	512	
Purlin Weight					1928.0
Combined Truss and Purlin Weight					4656.4

FINK TRUSS

Span 60 Rise 12 Spacing 18

P = 4375

W = 2175



Member	Stress	l	r	S	Area Required	Area Actual	w	No. of Pieces	Weight
Y1	53520	8.08	1.23	9215	5.80	5.72	9.7	4	313.5
Y2	52210	8.08	1.23	9215		5.72	9.7	4	313.5
Y5	50065	8.08	1.23	9215		5.72	9.7	4	313.5
Y6	48710	8.08	1.23	9215		5.72	9.7	4	313.5
X1	51985	8.70		15000	3.47	3.64	7.1	4	247.1
X3	43265	8.70		15000		3.64	7.1	4	247.1
X7	26660	22.50		15000	1.76	1.94	3.19	2	201.6
1-2	6115	3.23	.39	8360	.65	.94	3.19	2	20.6
5-6	6115	3.23	.39	8360	.65	.94	3.19	2	20.6
3-4	12665	6.46	.61	7205	1.76	1.88	3.19	4	82.4
2-3	8520	8.70		15000	.57	.75	3.19	2	55.5
4-5	8520	8.70		15000	.57	.75	3.19	2	55.5
4-7	16805	8.70		15000	1.12	1.84	3.92	4	136.4
6-7	25525	8.70		15000	1.70	1.84	3.92	4	136.4
7-7'		12.00					3.19	1	38.3
Total Weight Main Members									2495.5
Details - 20%									499.1
Total Truss Weight									2994.6

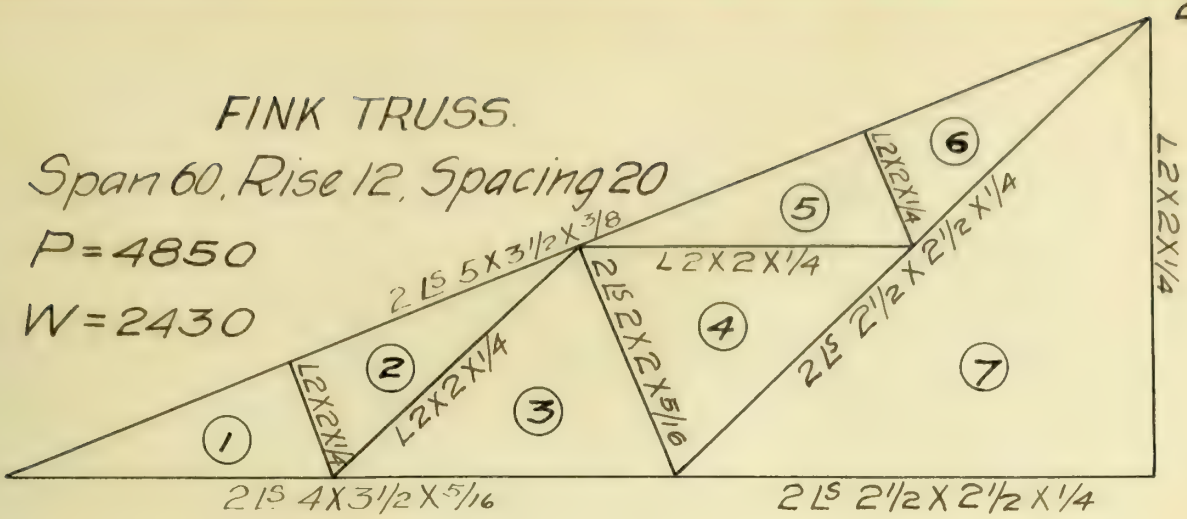
Size Purlin	No.	Length	Wt. per Foot	Weight	
7" I Beam	6	18	15.00	1620.0	
7" Channel	4	18	9.75	702.0	
Purlin Weight					2322.0
Combined Truss and Purlin Wt.					5316.6

FINK TRUSS.

Span 60, Rise 12, Spacing 20

P = 4850

W = 2430



Member	Stress	Length	Rad. of Gyration	S	Area Required	Area Actual	w	No. of Pieces	Weight
Y 1	59440	8.08	1.46	9735	6.11	6.09	10.4	4	336.1
Y 2	57990	8.08	1.46	9735		6.09	10.4	4	336.1
Y 5	55610	8.08	1.46	9735		6.09	10.4	4	336.1
Y 6	54105	8.08	1.46	9735		6.09	10.4	4	336.1
X 1	57745	8.70		15000	3.85	3.96	7.6	4	264.5
X 3	48045	8.70		15000		3.96	7.6	4	264.5
X 7	29595	25.20		15000	1.97	1.94	4.0	2	201.6
1-2	6795	3.23	.39	8360	.79	.94	3.19	2	20.6
5-6	6795	3.23	.39	8360	.79	.94	3.19	2	20.6
3-4	14075	6.46	.60	7115	1.98	2.30	3.92	4	82.4
2-3	9465	8.70		15000	.63	.75	3.19	2	55.5
4-5	9465	8.70		15000	.63	.75	3.19	2	55.5
4-7	18685	8.70		15000	1.25	1.84	3.19	4	139.2
6-7	28150	8.70		15000	1.88	1.84	3.19	4	139.2
7-7'		12.00						1	38.3
Weight of Main Members									2626.3
Details - 20%									525.3
Total Truss Weight									3151.6

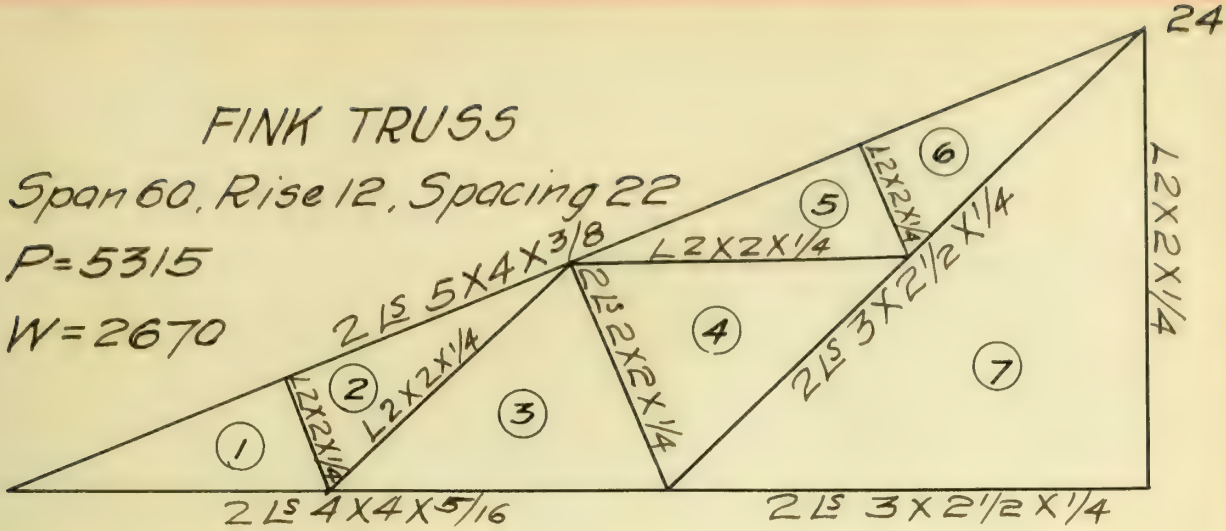
Size Purlins.	No.	Length	Wt. per Foot	Weight	
8" I Beam	6	20	18.00	2180	
8" Channel	4	20	11.25	900	
Purlin Weight					3080.0
Combined Truss and Purlin Weight					6231.6

FINK TRUSS

Span 60, Rise 12, Spacing 22

P=5315

W=2670



Member	Stress	l	r	S	Area Required	Area Actual	w	No. of Pieces	Weight
Y1	65175	8.08	1.59	9960	6.54	6.47	11.0	4	355.5
Y2	63585	8.08	1.59	9960		6.47	11.0	4	355.5
Y5	60975	8.08	1.59	9960		6.47	11.0	4	355.5
Y6	59335	8.08	1.59	9960		6.47	11.0	4	355.5
X1	63320	8.70		15000	4.22	4.26	8.2	4	285.4
X3	52675	8.70		15000		4.26	8.2	4	285.4
X7	32450	25.20		15000	2.16	2.18	4.5	2	226.8
1-2	7450	3.23	.39	8360	.89	.94	3.19	2	20.6
5-6	7450	3.23	.39	8360	.89	.94	3.19	2	20.6
3-4	15440	6.46	.60	7115	2.17	2.30	3.19	4	82.4
2-3	10380	8.70		15000	.69	.75	3.19	2	68.2
4-5	10380	8.70		15000	.69	.75	3.19	2	68.2
4-6	20500	8.70		15000	1.37	2.18	4.5	4	156.6
6-7	30880	8.70		15000	2.06	2.18	4.5	4	156.6
7-7'		12.00					3.19	1	38.3
Total Weight Main Members									2831.1
Details 20%									566.2
Total Truss Weight.									3397.3

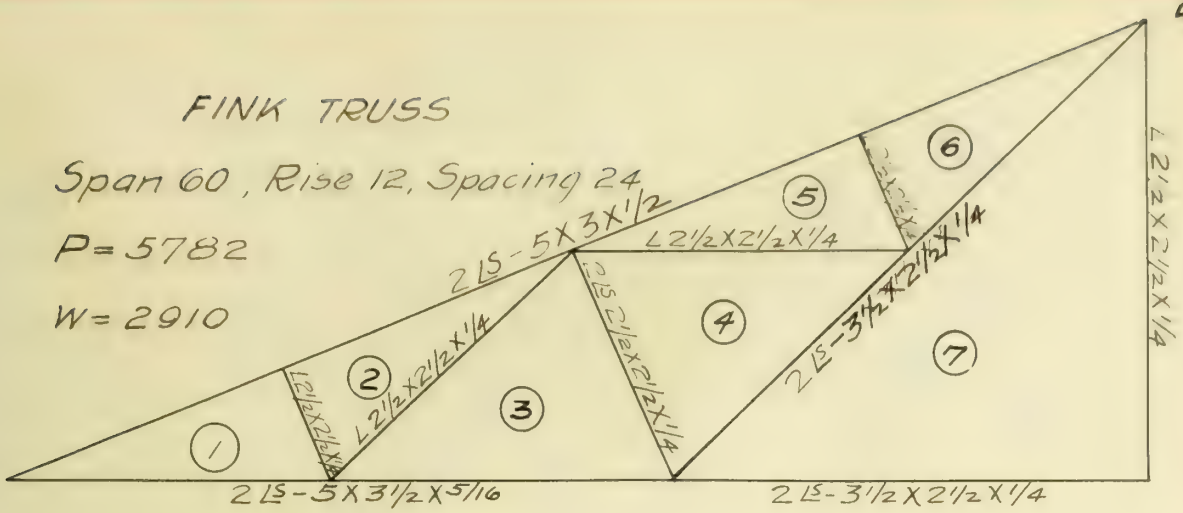
Size Purlin	No.	Length	Wt. per Foot	Weight	
8" I Beam	6	22	20.25	2673.0	
8" Channel	4	22	11.25	990.0	
Purlin Weight					3663.0
Combined Purlin and Truss Wt.					7060.3

FINK TRUSS

Span 60, Rise 12, Spacing 24

P = 5782

W = 2910



Member	Stress	Length	Radius of Gyration	Working Stress	Area Required	Area Actual	Weight per Foot	No. of Pieces	Weight
Y1	70935	8.08	1.59	9960	7.12	7.50	12.8	4	413.7
Y2	69205	8.08	1.59	9960		7.50	12.8	4	413.7
Y5	66365	8.08	1.59	9960		7.50	12.8	4	413.7
Y6	64575	8.08	1.59	9960		7.50	12.8	4	413.7
X1	68920	8.70		15000	459	4.58	8.7	4	302.8
X3	57335	8.70		15000		4.58	8.7	4	302.8
X7	35310	25.20		15000	2.36	2.44	4.9	2	247.0
1-2	8110	3.23	.49	9205	.88	1.19	4.0	2	25.9
5-6	8110	3.23	.49	9205	.88	1.19	4.0	2	25.9
3-4	16805	6.46	.77	8305	2.03	2.38	4.0	4	103.4
2-3	11300	8.70		15000	.76	.97	4.0	2	69.6
4-5	11300	8.70		15000	.76	.97	4.0	2	69.6
4-6	22310	8.70		15000	1.49	2.44	4.9	4	170.5
6-7	33610	8.70		15000	2.24	2.44	4.9	4	170.5
7-7'		12.00					4.0	1	48.0
				Total Weight Main Members					3190.8
				Details 20%					638.1
				Total Weight Truss.					3828.9

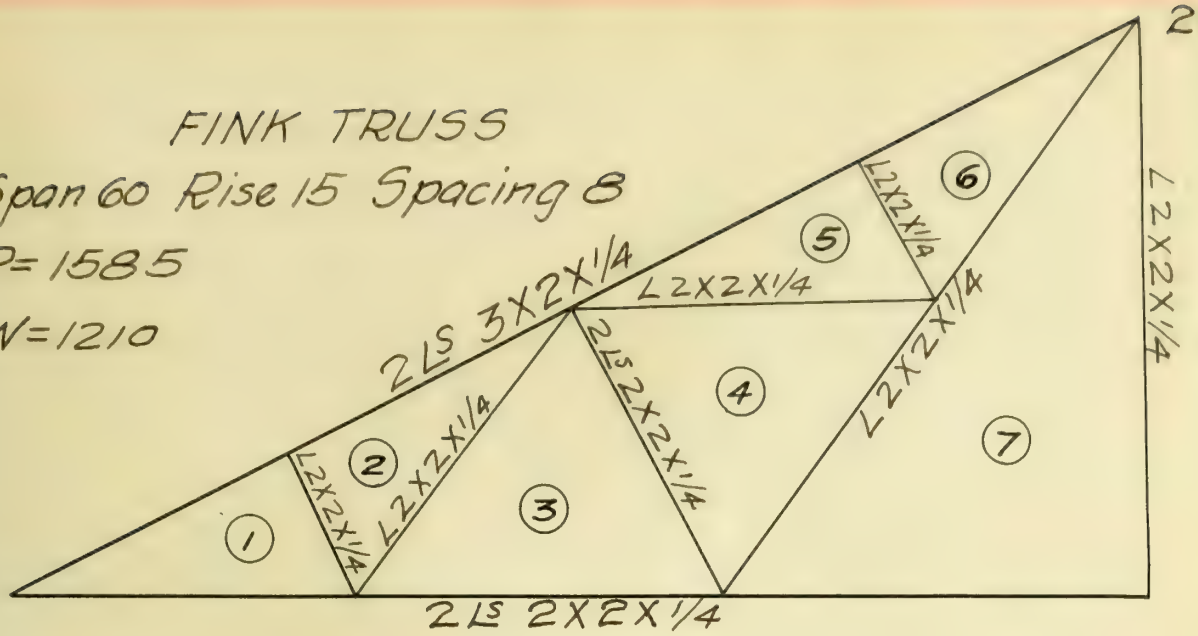
Size Purlin	No.	Length	Weight per Foot	Weight	
9" I Beam	6	24	21.00	3024.0	
9" Channel	4	24	13.25	1272.0	
Purlin Weight					4296.0
Sum of Truss and Purlin Weights.					8124.9

FINK TRUSS

Span 60 Rise 15 Spacing 8

P = 1585

W = 1210



Member	Stress	l	r	S	Area Required	Area Actual	W	No. of Pieces	Weight
Y1	17805	8.4	.89	7780	2.29	2.38	4	4	134.4
Y2	17175	8.4	.89	7780		2.38	4	4	134.4
Y5	16385	8.4	.89	7780		2.38	4	4	134.4
Y6	14645	8.4	.89	7780		2.38	4	4	134.4
X1	17265	9.4		15000	1.15	1.50	3.49	4	119.9
X3	14230	9.4		15000		1.94	3.49	4	119.9
X7	8400	22.5		15000		1.94	3.19	2	143.6
1-2	2635	4.2	.39	5115	.51	.94	3.19	2	26.8
5-6	2635	4.2	.39	5115	.51	.94	3.19	2	26.8
3-4	5270	8.4	.61	5615	.94	1.98	3.19	4	107.2
2-3	3915	9.4		15000	.26	.75	3.19	2	60.0
5-4	3915	9.4		15000	.26	.75	3.19	2	60.0
4-7	5830	9.4		15000	.39	.75	3.19	2	119.9
6-7	8745	9.4		15000	.59	.75	3.19	2	~~119.9~~
7-7'		15.0					3.19	1	47.9
							Weight Main Members		1369.6
							Details 14%		191.7
							Total Truss Weight		1561.3

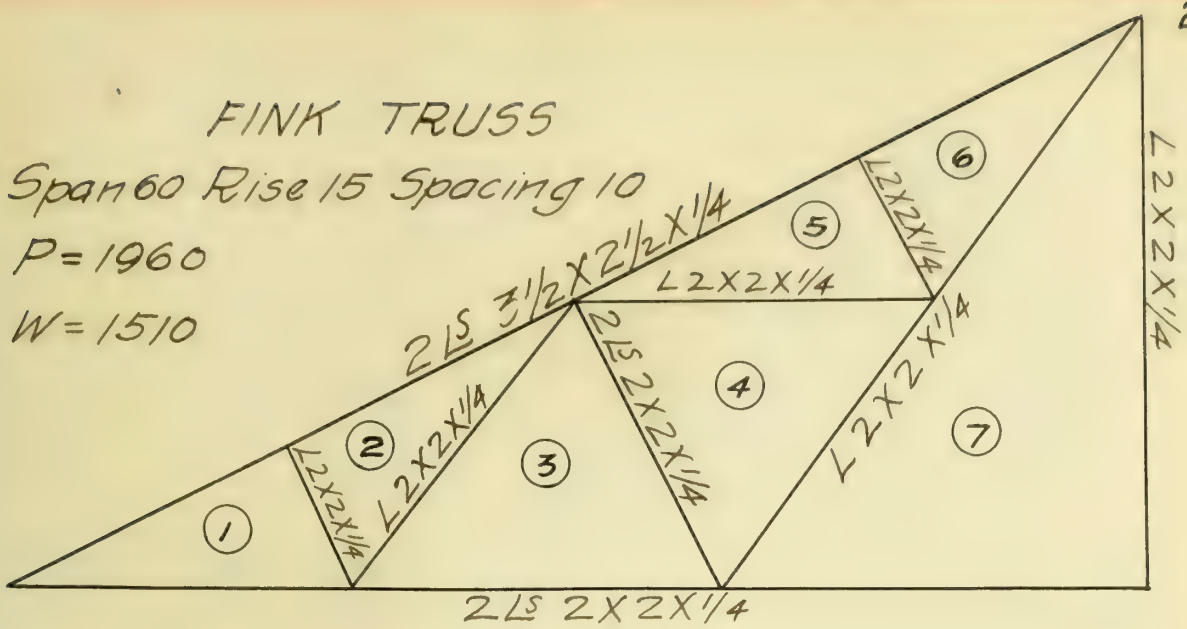
Size Purlin	No.	Length	Wt. per Foot	Weight	
4" I Beam	6	8	7.50	360.0	
4" Channel	4	8	5.25	168.0	
			Purlin Weight		528.0
			Combined Purlin and Truss Wt.		2089.3

FINK TRUSS

Span 60 Rise 15 Spacing 10

P = 1960

W = 1510



Member	Stress	l	r	S	Area Required	Area Actual	w	No. of Pieces	Weight
Y1	22085	8.4	1.09	8650	2.55	2.88	4.9	4	164.6
Y2	21300	8.4	1.09	8650		2.88	4.9	4	164.6
Y5	20320	8.4	1.09	8650		2.88	4.9	4	164.6
Y6	18165	8.4	1.09	8650		2.88	4.9	4	164.6
X1	21420	9.4		15000	1.43	1.50	3.19	4	119.9
X3	17650	9.4		15000		1.50	3.19	4	119.9
X7	10410	22.5		15000		1.50	3.19	2	143.6
1-2	3275	4.2	.39	5115	.64	.94	3.19	2	26.8
5-6	3275	4.2	.39	5115	.64	.94	3.19	2	26.8
3-4	6550	8.4	.61	5615	1.17	1.98	3.19	4	107.2
2-3	3620	9.4		15000	.24	.75	3.19	2	60.0
4-5	3620	9.4		15000	.24	.75	3.19	2	60.0
4-7	6700	9.4		15000	.45	.75	3.19	2	60.0
6-7	10060	9.4		15000	.67	.75	3.19	2	60.0
7-7		15.0					3.19	1	47.9
Weight Main Members									1490.5
Details 14%									208.6
Total Truss Weight.									1699.1

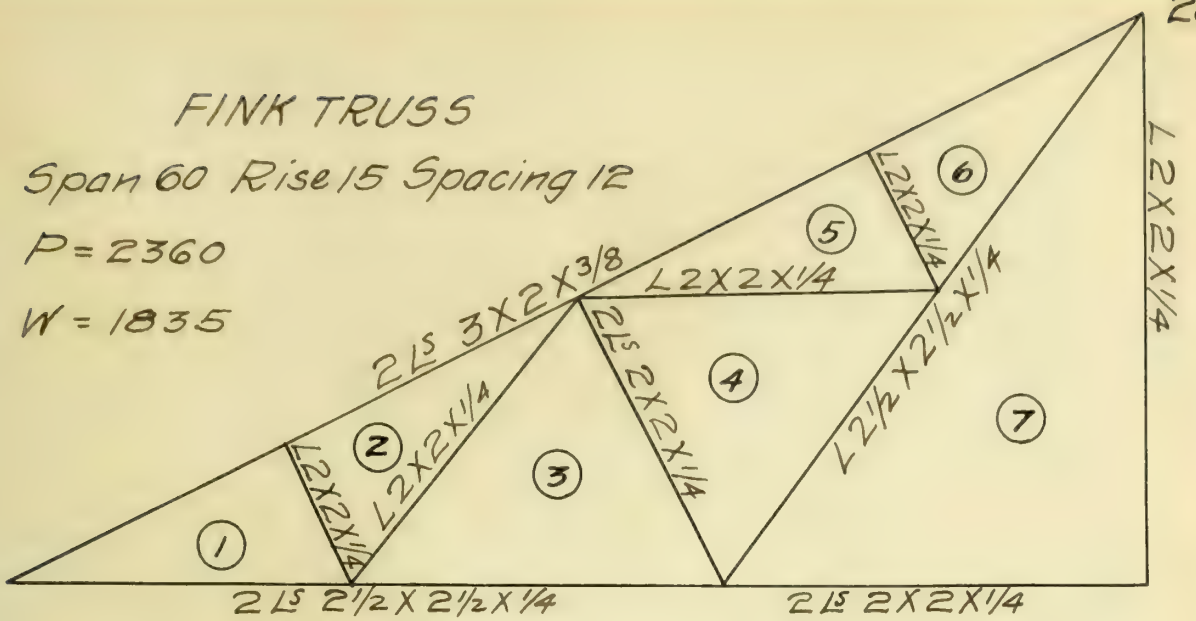
Size Purlin	No.	Length	Wt. per Foot.	Weight	
4" I Beam	6	10	7.50	450	
4" Channel	4	10	5.25	210	
Purlin Weight.					660.0
Combined Truss and Purlin Wt.					2359.1

FINK TRUSS

Span 60 Rise 15 Spacing 12

P = 2360

W = 1835

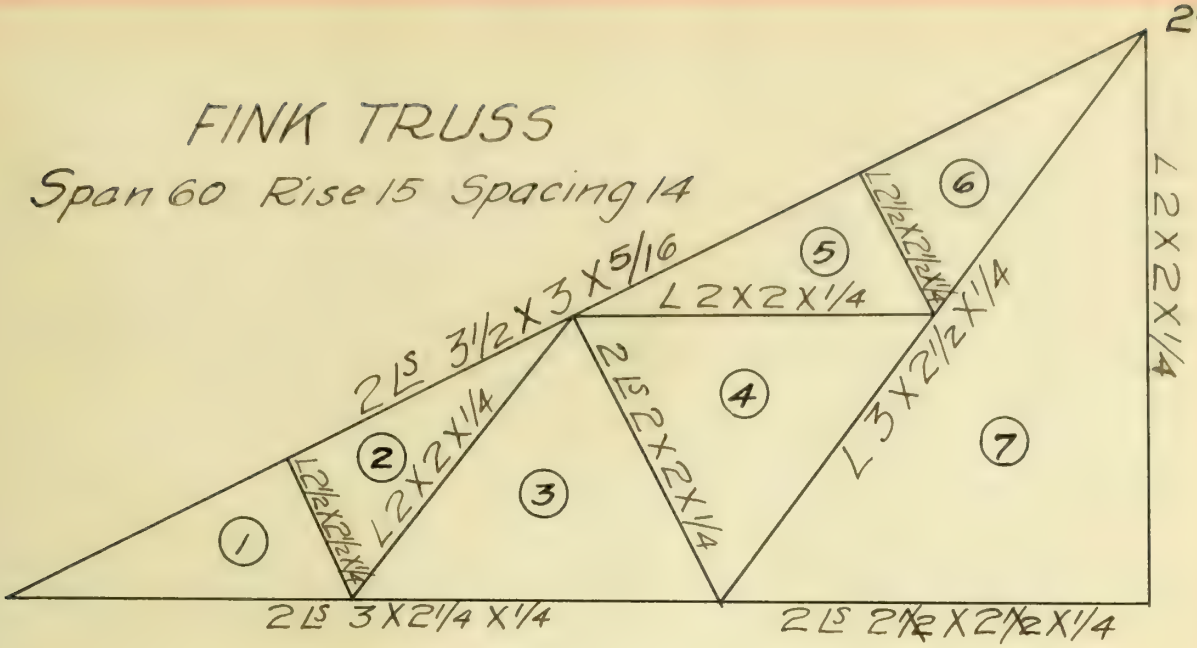


Member	Stress	l	r	S	Area Required	Area Actual	w	No. of Pieces	Weight
Y1	26670	8.4	.91	7885	3.38	3.46	5.9	4	198.2
Y2	25720	8.4	.91	7885		3.46	5.9	4	198.2
Y5	24540	8.4	.91	7885		3.46	5.9	4	198.2
Y6	23600	8.4	.91	7885		3.46	5.9	4	198.2
X1	25880	9.4		15000	1.73	1.94	4.0	4	150.4
X3	21315	9.4		15000		1.94	4.0	4	150.4
X7	12560	22.5		15000	.84	1.50	3.19	2	143.6
1-2	3955	42	.39	5115	.78	.94	3.19	2	26.8
5-6	3955	42	.39	5115	.78	.94	3.19	2	26.8
3-4	8110	8.4	.61	5615	1.45	1.88	3.19	4	107.2
2-3	4380	9.4		15000	.29	.75	3.19	2	60.0
4-5	4380	9.4		15000	.29	.75	3.19	2	60.0
4-7	8760	9.4		15000	.59	.97	4.0	2	75.2
6-7	13140	9.4		15000	.88	.97	4.0	2	75.2
7-7'		15.0					3.19	1	47.9
Weight Main Members									1716.3
Details 14%									240.2
Total Truss Weight									1956.5

Size Purlin	No.	Length	Wt. per Foot	Weight	
5" I Beam	6	12	9.75	702.0	
5" Channel	4	12	6.50	312.0	
Purlin Weight					1014.0
Combined Purlin and Truss Wt.					2970.5

FINK TRUSS

Span 60 Rise 15 Spacing 14



Member	Stress	l	r	S	Area Required	Area Actual	w	No. of Pieces	Weight
Y1	31085	8.4	1.10	8680	3.58	3.86	6.6	4	221.8
Y2	29980	8.4	1.10	8680		3.86	6.6	4	221.8
Y5	28600	8.4	1.10	8680		3.86	6.6	4	221.8
Y6	27490	8.4	1.10	8680		3.86	6.6	4	221.8
X1	30190	9.4		15000	2.01	2.18	4.5	4	169.2
X3	24880	9.4		15000	1.66	2.18	4.5	4	169.2
X7	14660	22.5		15000	.98	1.50	3.19	2	143.6
1-2	4611	4.2	.49	8215	.56	1.19	4.0	2	33.6
5-6	4611	4.2	.49	8215	.56	1.19	4.0	2	33.6
3-4	9220	8.4	.59	5400	1.71	1.88	3.19	4	107.2
2-3	5105	9.4		15000	.34	.94	3.19	2	60.0
4-5	5105	9.4		15000	.34	.94	3.19	2	60.0
4-7	10210	9.4		15000	.68	1.09	4.5	2	84.6
6-7	15315	9.4		15000	1.02	1.09	4.5	2	84.6
7-7'		15.0					3.19	1	47.9
Weight Main Members									1880.7
Details 14%									263.2
Total Truss Weight									2143.9

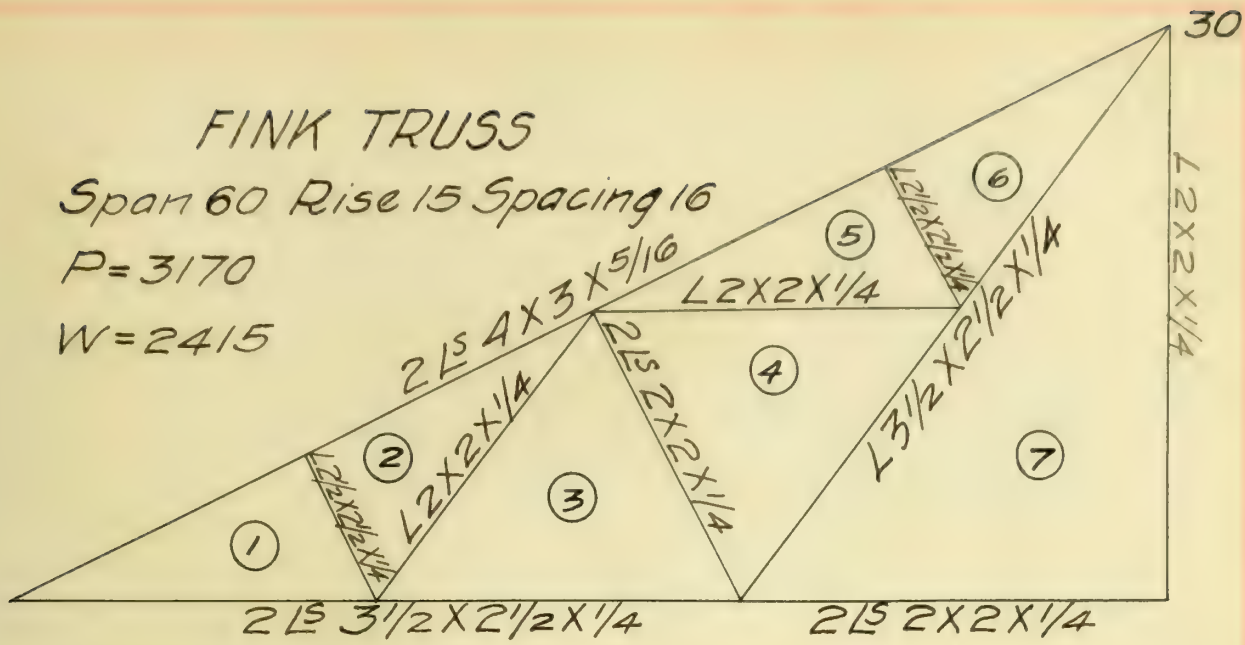
Size Purlin	No.	Length	Wt. per Foot	Weight	
6" I Beam	6	14	12.25	1029	
6" Channel	4	14	8.00	448	
Purlin Weight					1477.0
Combined Purlin and Truss Wt.					3620.9

FINK TRUSS

Span 60 Rise 15 Spacing 16

P = 3170

W = 2415



Member	Stress	l	r	S	Area. Required	Area. Actual	w	No. of Pieces	Weight
Y 1	35590	8.4	1.27	9195	3.87	4.18	7.1	4	238.6
Y 2	34320	8.4	1.27	9195		4.18	7.1	4	238.6
Y 5	32735	8.4	1.27	9195		4.18	7.1	4	238.6
Y 6	31465	8.4	1.27	9195		4.18	7.1	4	238.6
X 1	34505	9.4		15000	2.30	2.44	4.9	4	184.2
X 3	28440	9.4		15000		2.44	4.9	4	184.2
X 7	16785	22.5		15000	1.12	1.50	3.19	2	143.6
1-2	5270	4.2	.49	8215	.64	1.19	4.0	2	33.6
5-6	5270	4.2	.49	8215	.64	1.19	4.0	2	33.6
3-4	10540	8.4	.60	5615	1.88	1.88	3.19	4	107.2
2-3	5825	9.4		15000	.40	.75	3.19	2	60.0
4-5	5825	9.4		15000	.40	.75	3.19	2	60.0
4-7	11650	9.4		15000	.76	1.25	4.9	2	92.2
6-7	17475	9.4		15000	1.17	1.25	4.9	2	92.2
7-7'		15.0					3.19	1	47.9
Weight Main Members									1993.1
Details 14%									278.9
Total Weight of Truss									2272.0

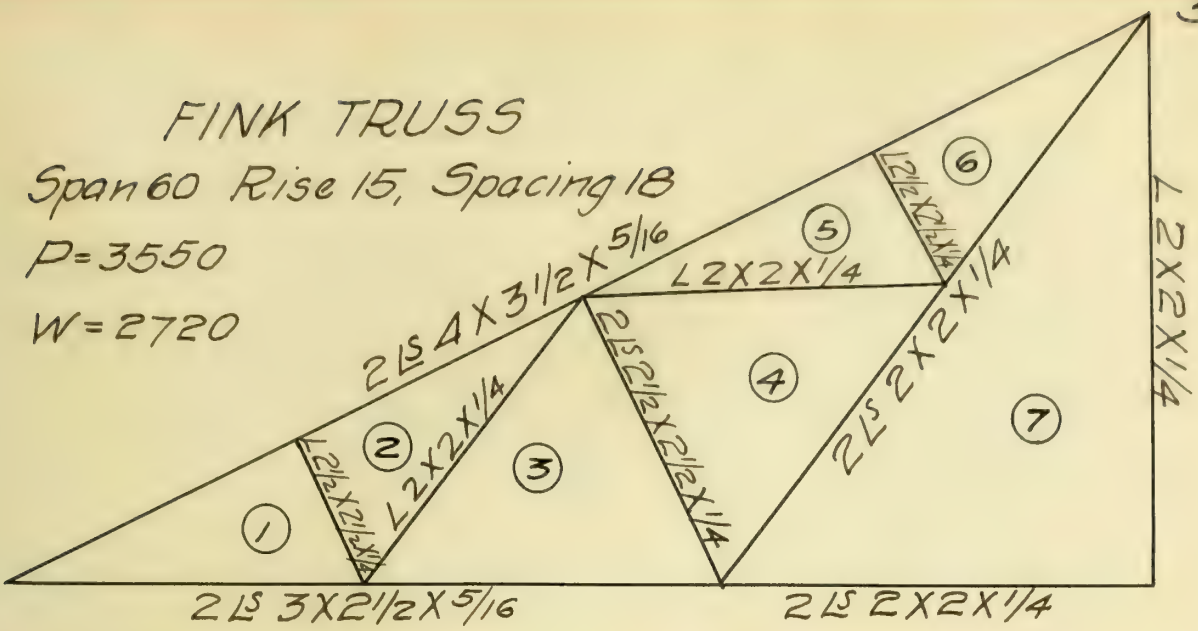
Size Purlin	No	Length	Weight per Foot	Weight	
6" I Beam	6	16	14.75	1416	
6" Channel	4	16	8.00	512	
Weight Purlins					1928.0
Sum of Purlin and Truss Wts.					4200.0

FINK TRUSS

Span 60 Rise 15, Spacing 18

P = 3550

W = 2720



Member	Stress	l	r	S	Area Required	Area Actual	w	No. of Pieces	Weight
Y1	39930	8.4	1.26	9165	4.35	4.50	7.6	4	255.4
Y2	38510	8.4	1.26	9165		4.50	7.6	4	255.4
Y5	36735	8.4	1.26	9165		4.50	7.6	4	255.4
Y6	35310	8.4	1.26	9165		4.50	7.6	4	255.4
X1	38720	9.4		15000	2.58	2.90	5.5	4	206.8
X3	31905	9.4		15000		2.90	5.5	4	206.8
X7	18825	22.5		15000	1.26	1.50	3.19	2	143.6
1-2	5915	4.2	.49	8215	.72	1.19	4.0	2	33.6
5-6	5915	4.2	.49	8215	.72	1.19	4.0	2	33.6
3-4	11830	8.4	.77	7455	1.59	2.38	4.0	4	134.4
2-3	6540	9.4		15000	.44	.75	3.19	2	60.0
4-5	6540	9.4		15000	.44	.75	3.19	2	60.0
4-7	13080	9.4		15000	.87	1.50	3.19	4	119.9
6-7	19620	9.4		15000	1.31	1.50	3.19	4	119.9
7-7'		15.0					3.19	1	47.9
Weight Main Members									2188.1
Details 14%									306.3
Total Truss Weight									2494.4

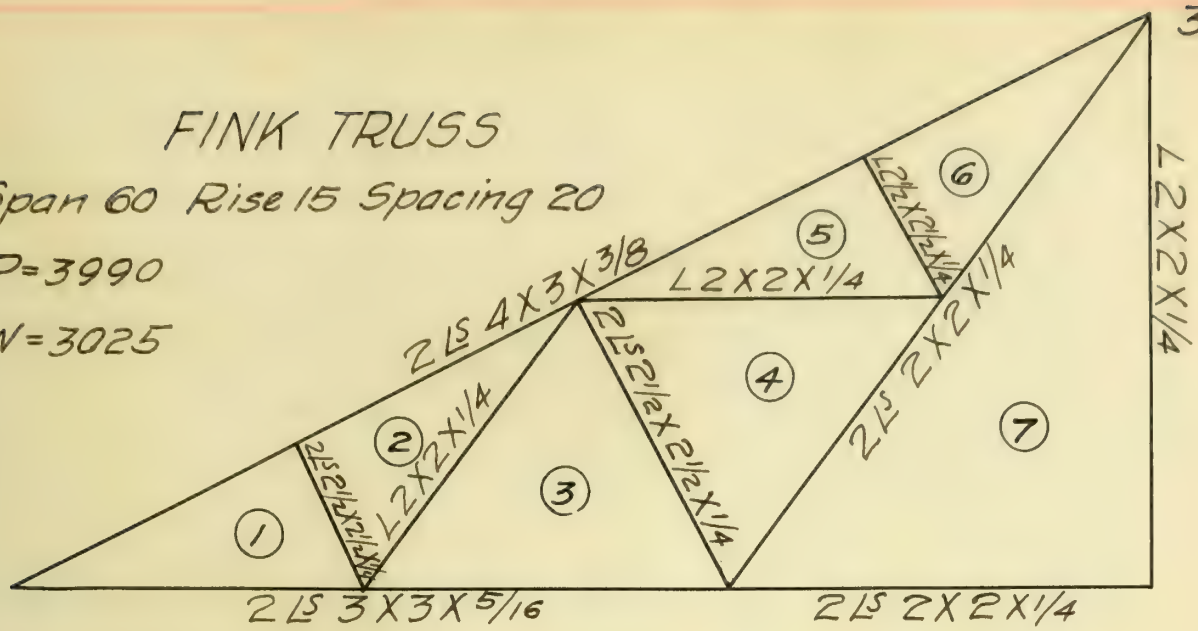
Size Purlin	No.	Length	Wt. per Foot	Weight	
7" I Beam	6	18	15.00	1620	
7" Channel	4	18	9.75	702	
Purlin Weight					2322.0
Combined Truss and Purlin Wt.					4816.4

FINK TRUSS

Span 60 Rise 15 Spacing 20

P=3990

W=3025



Member	Stress	l	r	S	Area Required	Area Actual	w	No. of Pieces	Weight
Y1	44730	8.4	1.26	9165	4.88	4.96	8.4	4	282.2
Y2	43135	8.4	1.26	9165		4.96	8.4	4	282.2
Y5	41140	8.4	1.26	9165		4.96	8.4	4	282.2
Y6	39545	8.4	1.26	9165		4.96	8.4	4	282.2
X1	43355	9.4		15000	2.89	3.02	6.0	4	225.6
X3	35740	9.4		15000		3.02	6.0	4	225.6
X7	21100	22.5		15000	1.41	1.50	3.19	2	143.6
1-2	6615	4.2	.49	8215	.81	1.19	4.0	2	33.6
5-6	6615	4.2	.49	8215	.81	1.19	4.0	2	33.6
3-4	13230	8.4	.77	7455	1.78	2.38	4.0	4	134.4
2-3	7320	9.4		15000	.49	.75	3.19	2	60.0
4-5	7320	9.4		15000	.49	.75	3.19	2	60.0
4-7	14640	9.4		15000	.98	1.50	4.0	4	119.9
6-7	21960	9.4		15000	1.47	1.50	4.0	4	119.9
7-7'		15.0					3.19	1	47.9
Weight Main Members									2332.9
Details 14%									326.6
Total Truss Weight									2659.5

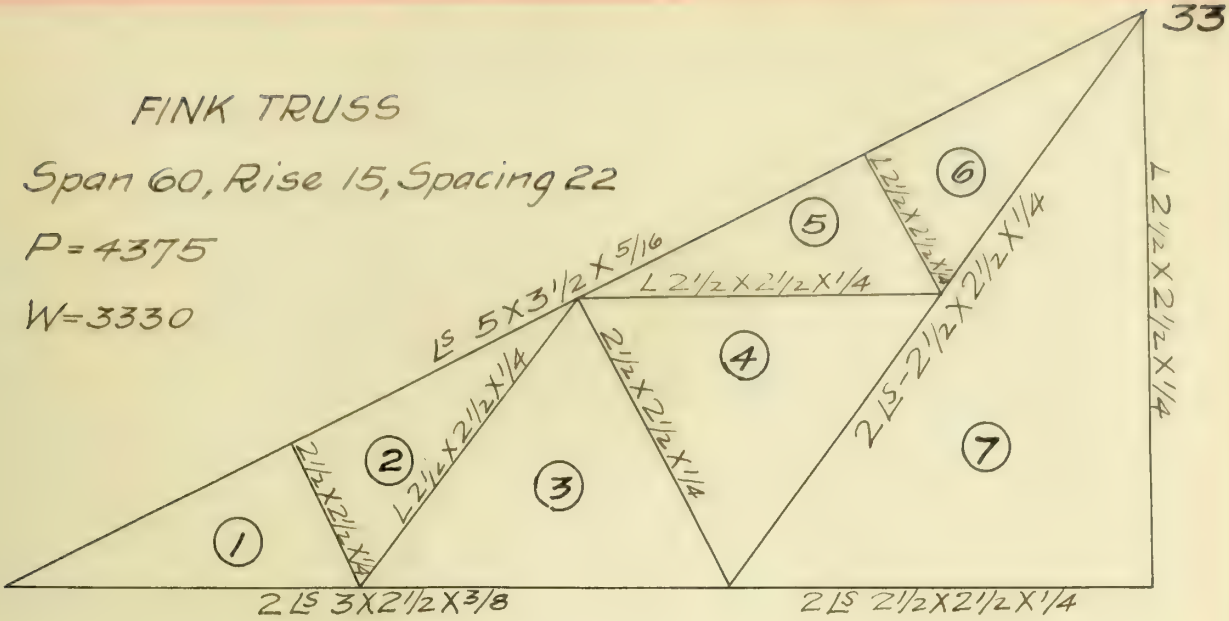
Size Purlin	No.	Length	Wt. per Foot	Weight
8" I Beam	6	20	18.00	2180
8" Channel	4	20	11.25	900
Purlin Weight				3080.0
Combined Truss and Purlin Wt.				5739.5

FINK TRUSS

Span 60, Rise 15, Spacing 22

P = 4375

W = 3330



Member	Stress	Length	Radius of Gyration	Working Stress	Area Required	Area Actual	Weight per Foot	No. of Pieces	Weight
Y1	49105	8.4	1.45	9605	5.12	5.12	8.7	4	292.3
Y2	47360	8.4	1.45	9605		5.12	8.7	4	292.3
Y5	45175	8.4	1.45	9605		5.12	8.7	4	292.3
Y6	43425	8.4	1.45	9605		5.12	8.7	4	292.3
X1	47705	9.4		15000	3.18	3.18	6.5	4	244.4
X3	39240	9.4		15000		3.18	6.5	4	244.4
X5	23160	22.5		15000	1.54	1.94	4.0	2	180.0
1-2	7270	4.2	.49	8215	.89	1.19	4.0	2	33.6
5-6	7270	4.2	.49	8215	.89	1.19	4.0	2	33.6
3-4	14540	8.4	.77	7455	1.95	2.38	4.0	4	134.4
2-3	8040	9.4		15000	.54	.97	4.0	2	75.2
4-5	8040	9.4		15000	.54	.97	4.0	2	75.2
4-7	16080	9.4		15000	1.07	1.94	4.0	4	150.4
6-7	24120	9.4		15000	1.61	194	4.0	4	150.4
7-7'		15.0					4.0	1	60.0
				Total Weight Main Members					2550.8
				Details 14%					356.2
				Total Weight Truss					2907.0

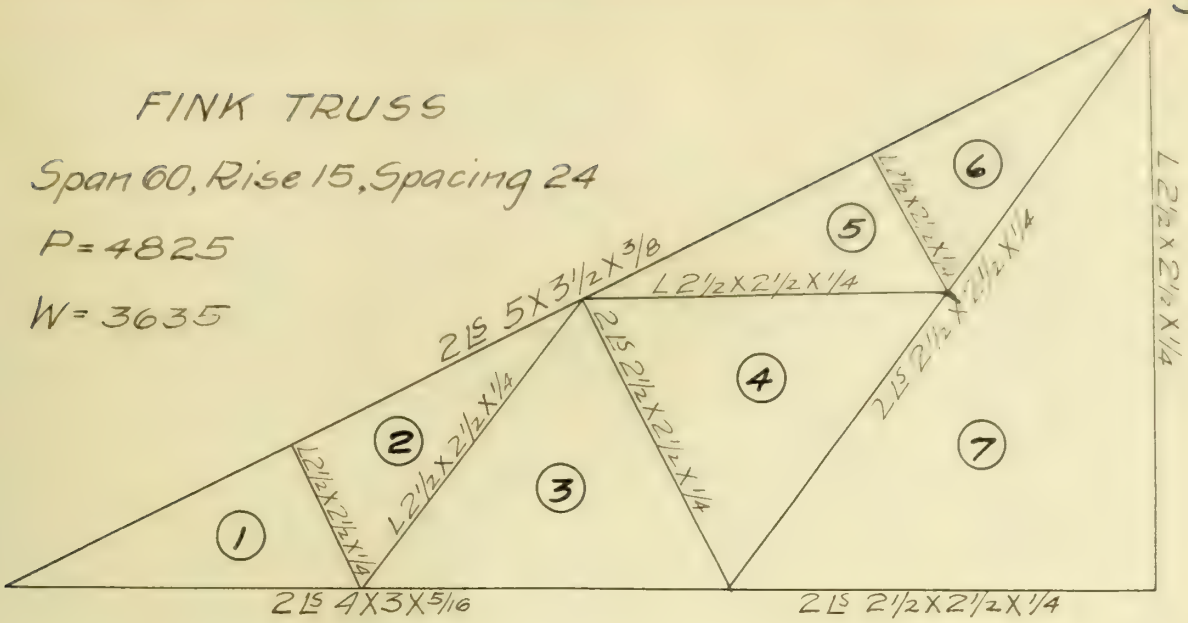
Size Purlin	No.	Length	Weight per Foot	Weight	
8" I Beam	6	22	20.25	2673	
8" Channel	4	22	11.25	990	
Purlin Weight					3663.0
Sum of Purlin and Truss Wts.					6570.0

FINK TRUSS

Span 60, Rise 15, Spacing 24

P = 4825

W = 3635



Member	Stress	Length	Radius of Gyration	Working Stress	Area Required	Area Actual	Weight per Foot	No. of Pieces	Weight
Y1	53985	8.4	1.46	9625	5.61	6.09	10.4	4	349.4
Y2	52055	8.4	1.46	9625		6.09	10.4	4	349.4
Y5	49645	8.4	1.46	9625		6.09	10.4	4	349.4
Y6	47715	8.4	1.46	9625		6.09	10.4	4	349.4
X1	52305	9.4		15000	3.47	3.64	7.1	4	267.0
X3	43125	9.4		15000		3.64	7.1	4	267.0
X7	25480	22.5		15000	1.69	1.94	4.0	2	180.0
1-2	7970	4.2	.49	8215	.97	1.19	4.0	2	33.6
5-6	7970	4.2	.49	8215	.97	1.19	4.0	2	33.6
3-4	15940	8.4	.77	7455	2.14	2.38	4.0	4	134.4
2-3	8825	9.4		15000	.59	.97	4.0	2	75.2
4-5	8825	9.4		15000	.59	.97	4.0	2	75.2
4-7	17650	9.4		15000	1.17	1.94	4.0	4	150.4
6-7	26475	9.4		15000	1.77	1.94	4.0	4	150.4
7-7'							4.0	1	60.0
				Total Weight Main Members					2824.4
				Details 14%					395.0
				Total Weight of Truss					3219.4

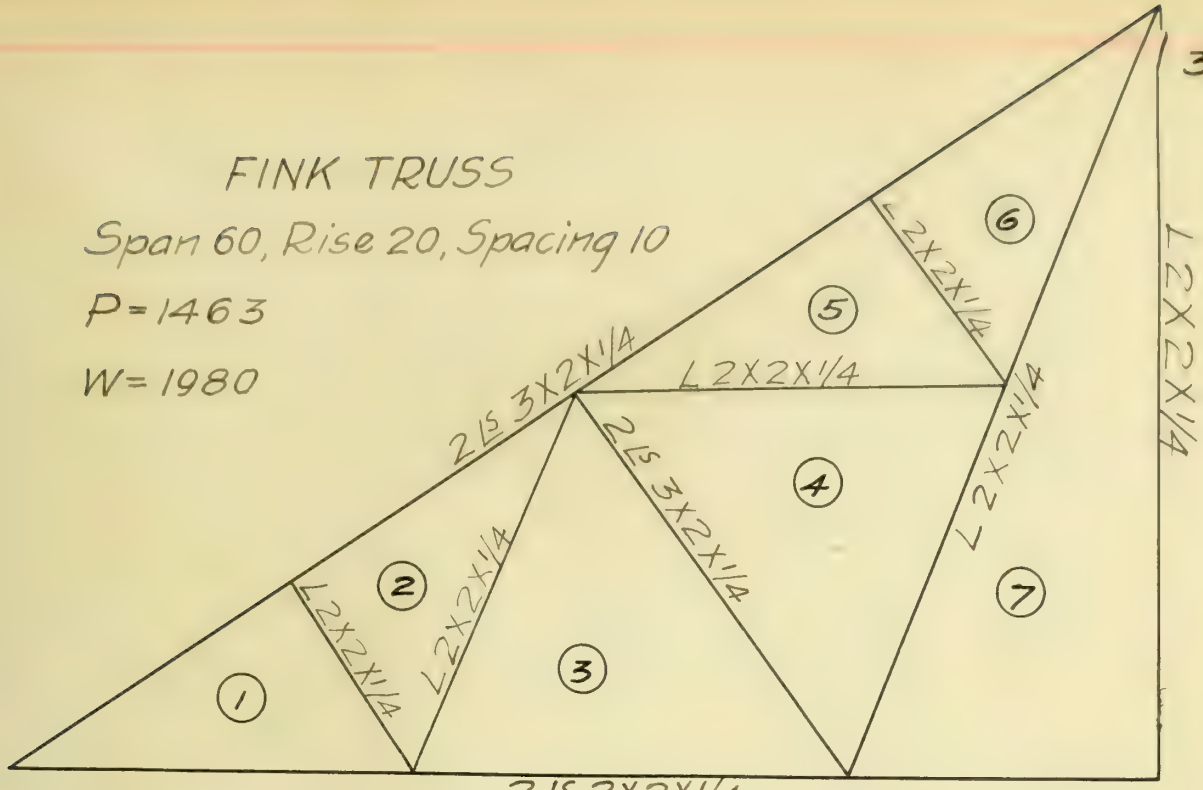
Size Purlin	No.	Length	Weight per Foot	Weight.	
9" I Beam	6	24	21.00	3024.0	
9" Channel	4	24	13.25	1272.0	
Purlin Weight					4296.0
Sum of Truss and Purlin Wts.					7515.4

FINK TRUSS

Span 60, Rise 20, Spacing 10

P = 1463

W = 1980



Member	Stress	l	r	S	Area Required	Area Actual	w	No. of Pieces	Weight
Y1	15355	9	.89	6440	239	238	4	4	144.0
Y2	14625	9	.89	6440			4	4	144.0
Y5	13750	9	.89	6440			4	4	144.0
Y6	12975	9	.89	6440			4	4	144.0
X1	15080	10.8		15000	1.01	1.50	3.19	4	137.8
X3	12130	10.8		15000			3.19	4	137.8
X7	6370	16.8		15000	.43	1.50	3.19	2	107.2
1-2	3150	6	.39	4810	.66	.94	3.19	2	38.3
5-6	3150	6	.39	4810	.66	.94	3.19	2	38.3
3-4	6407	12	.89	5750	1.12	2.38	4	4	192.0
2-3	2852	10.8		15000	.19	.75	3.19	2	68.9
4-5	2852	10.8		15000	.19	.75	3.19	2	68.9
4-7	5760	10.8		15000	.40	.75	3.19	2	68.9
6-7	8710	10.8		15000	.60	.75	3.19	2	68.9
7-7'		20.0					3.19	1	63.8
				Weight of Members					1566.8
				Details 14%					219.6
				Weight of Trusses					1786.4

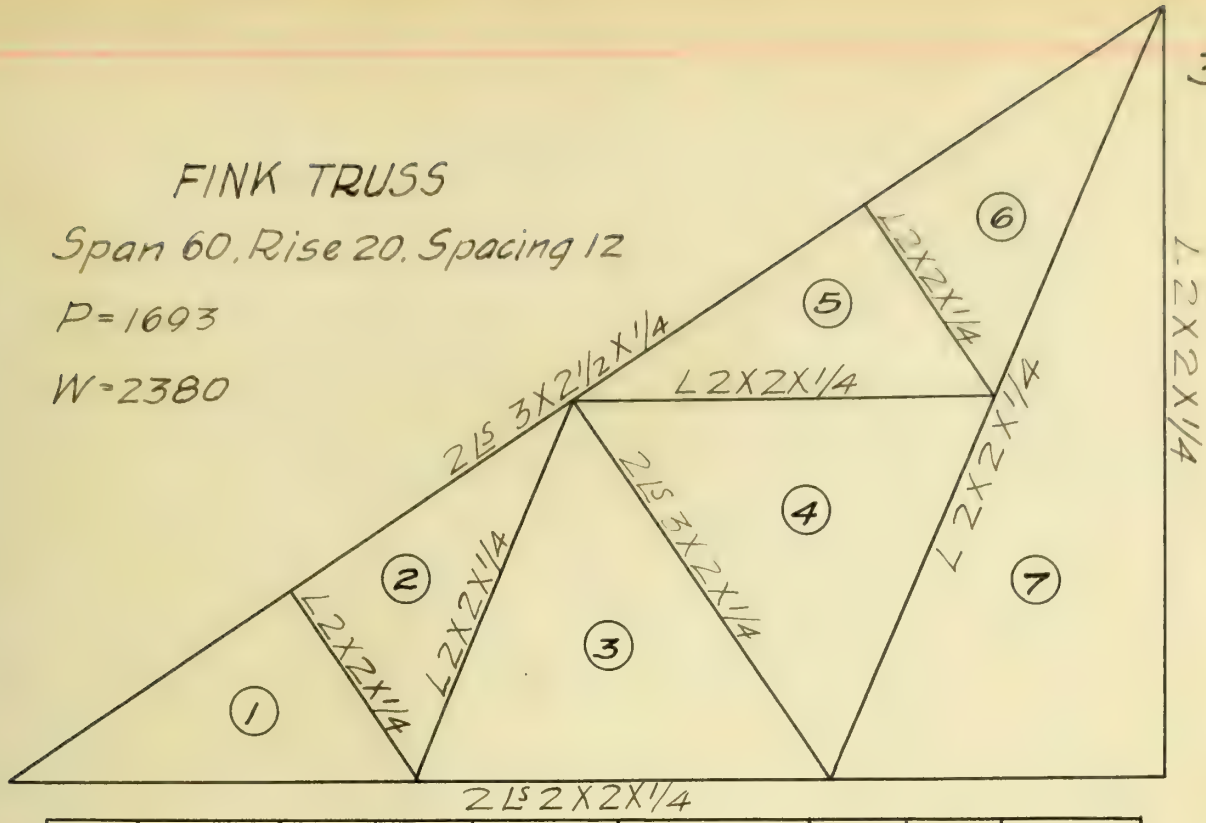
Size Purlin	No.	Length	Wt. per Foot	Weight	
4" I Beam	6	10	7.50	450	
4" Channel	4	10	5.25	210	
			Weight Purlins		660.0
			Sum Purlin and Truss Weights		2446.4

FINK TRUSS

Span 60. Rise 20. Spacing 12

P = 1693

W = 2380



Member	Stress	l	r	S	Area Required	Area Actual	w	No. of Pieces	Weight
Y1	18045	9	.95	7760	234	2.62	4.5	4	162.0
Y2	17200	9	.95	7760			4.5	4	162.0
Y5	16185	9	.95	7760			4.5	4	162.0
Y6	15340	9	.95	7760			4.5	4	162.0
X1	17780	10.8		15000	1.19	1.50	3.19	4	137.8
X3	14285	10.8		15000			3.19	4	137.8
X7	7460	16.8		15000	.50	1.50	3.19	2	107.2
1-2	3735	6	.39	4810	.80	.94	3.19	2	38.3
5-6	3735	6	.39	4810	.80	.94	3.19	2	38.3
3-4	7470	12	.89	5750	1.30	2.38	4.0	4	192.0
2-3	3495	10.8		15000	.24	.75	3.19	2	68.9
4-5	3495	10.8		15000	.24	.75	3.19	2	68.9
4-7	6825	10.8		15000	.46	.75	3.19	2	68.9
6-7	10320	10.8		15000	.70	.75	3.19	2	68.9
7-7'		20.0					3.19	1	63.8
Weight Members									1638.8
Details 14%									229.7
Weight Truss									1868.5

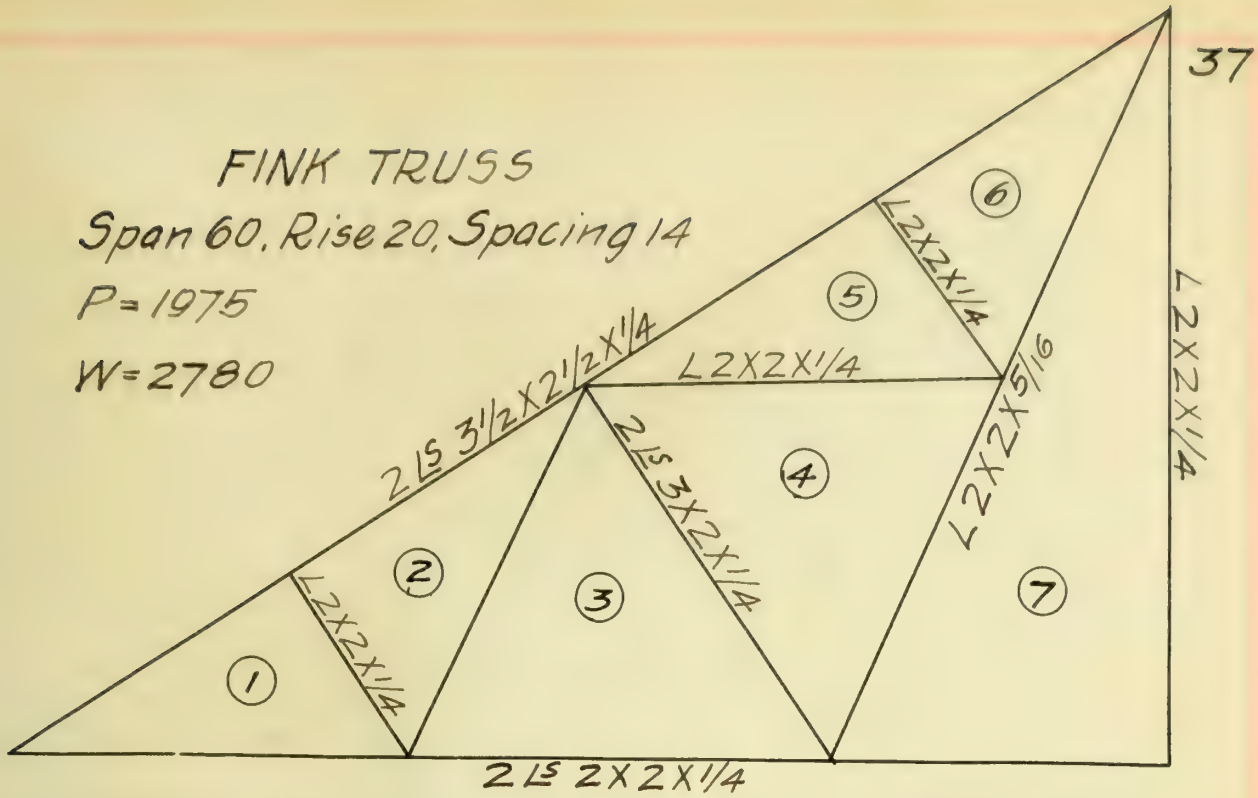
Size Purlin.	No.	Length	Wt. per Foot	Weight	
5" I Beam	6	12	9.75	702.0	
5" Channel	4	12	6.50	312.0	
Weight Purlins					1014.0
Sum Purlin and Truss Weights					2882.5

FINK TRUSS

Span 60, Rise 20, Spacing 14

P = 1975

W = 2780



Member	Stress	l	r	S	Area Required	Area Actual	w	No. of Pieces	Weight
Y1	21130	9	1.09	8365	2.53	2.88	4.9	4	176.4
Y2	20125	9	1.09	8365			4.9	4	176.4
Y5	18950	9	1.09	8365			4.9	4	176.4
Y6	17940	9	1.09	8365			4.9	4	176.4
X1	20275	10.8		15000	1.35	1.50	3.19	4	137.8
X3	16795	10.8		15000			3.19	4	137.8
X7	8815	16.8		15000	.59	1.50	3.19	2	107.2
1-2	4405	6	.39	4810	.92	.94	3.19	2	38.3
5-6	4405	6	39	4810	.92	.94	4	2	38.3
3-4	8940	12	.89	5750	1.56	2.38	3.19	4	192.0
2-3	4005	10.8		15000	.27	.75	3.19	2	68.9
4-5	4005	10.8		15000	.27	.75	3.19	2	68.9
4-7	7985	10.8		15000	.54	.92	3.92	2	84.7
6-7	12068	10.8		15000	.80	.92	3.92	2	84.7
7-7'		20.0					3.19	1	63.8
Weight Members									1728.0
Details 14%									241.9
Weight Truss									1969.9

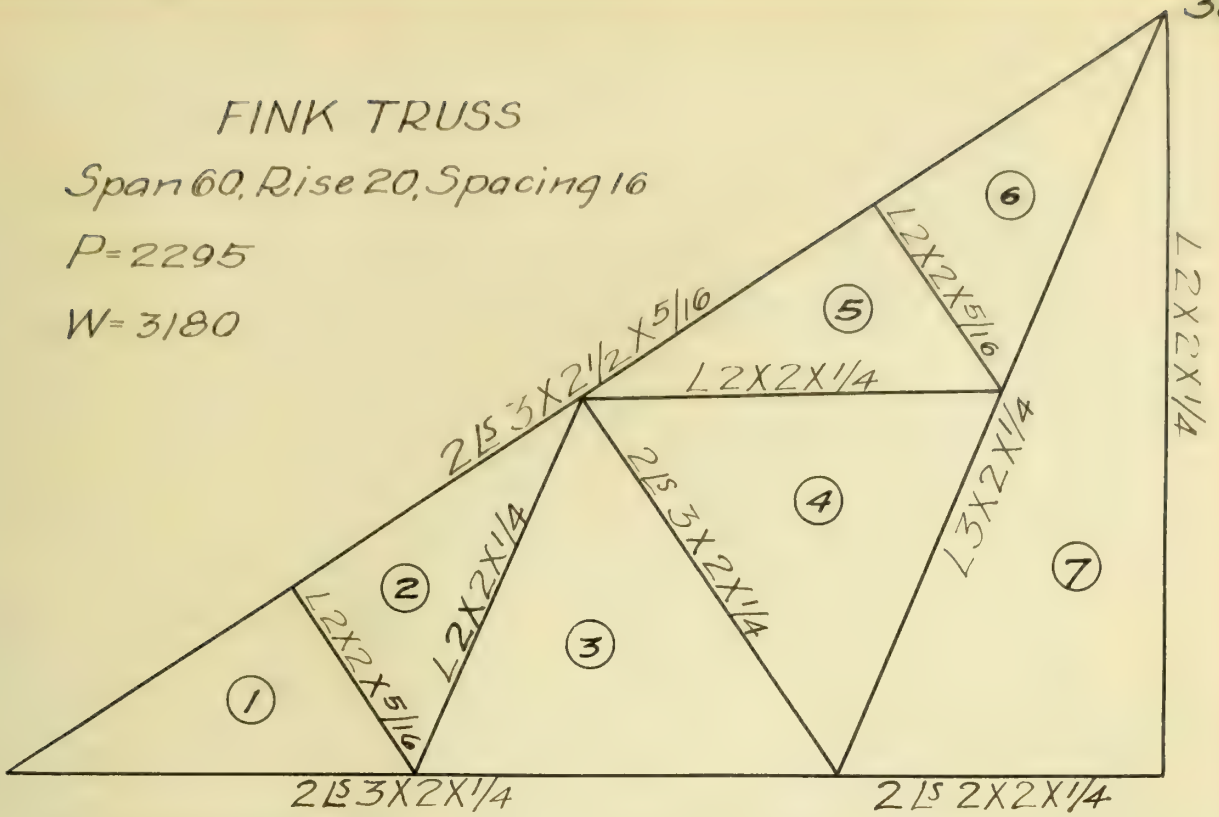
Size Purlin	No.	Length	Wt. per Foot	Weight	
6" I Beam	6	14	12.25	1029.0	
6" Channel	4	14	8.00	448.0	
Weight Purlins					1477.0
Sum Purlin and Truss Wt.s.					3446.9

FINK TRUSS

Span 60, Rise 20, Spacing 16

P = 2295

W = 3180



Member	Stress	l	r	S	Area Required	Area Actual	w	No. of Pieces	Weight
Y1	24280	9	.94	7710	3.15	3.24	5.5	4	198.0
Y2	23140	9	.94	7710				4	198.0
Y5	21760	9	.94	7710				4	198.0
Y6	20620	9	.94	7710				4	198.0
X1	23280	10.8		15000	1.55	1.94	4	4	172.8
X3	19305	10.8		15000				4	172.8
X7	10140	16.8		15000	.68	1.50	3.19	2	107.2
1-2	5055	6	.39	4810	1.05	1.15	3.19	2	38.3
5-6	5055	6	.39	4810	1.05	1.15	3.19	2	38.3
3-4	10250	12	.89	5750	1.79	2.38	4	4	192.0
2-3	4600	10.8		15000	.31	.75	3.19	2	68.9
4-5	4600	10.8		15000	.31	.75	3.19	2	68.9
4-7	9165	10.8		15000	.61	1.00	4	2	86.4
6-7	13855	10.8		15000	.93	1.00	4	2	86.4
7-7'		20.0					3.19	1	63.8
							Weight Members		1887.8
							Details 14%		264.5
							Weight Trusses		2152.3

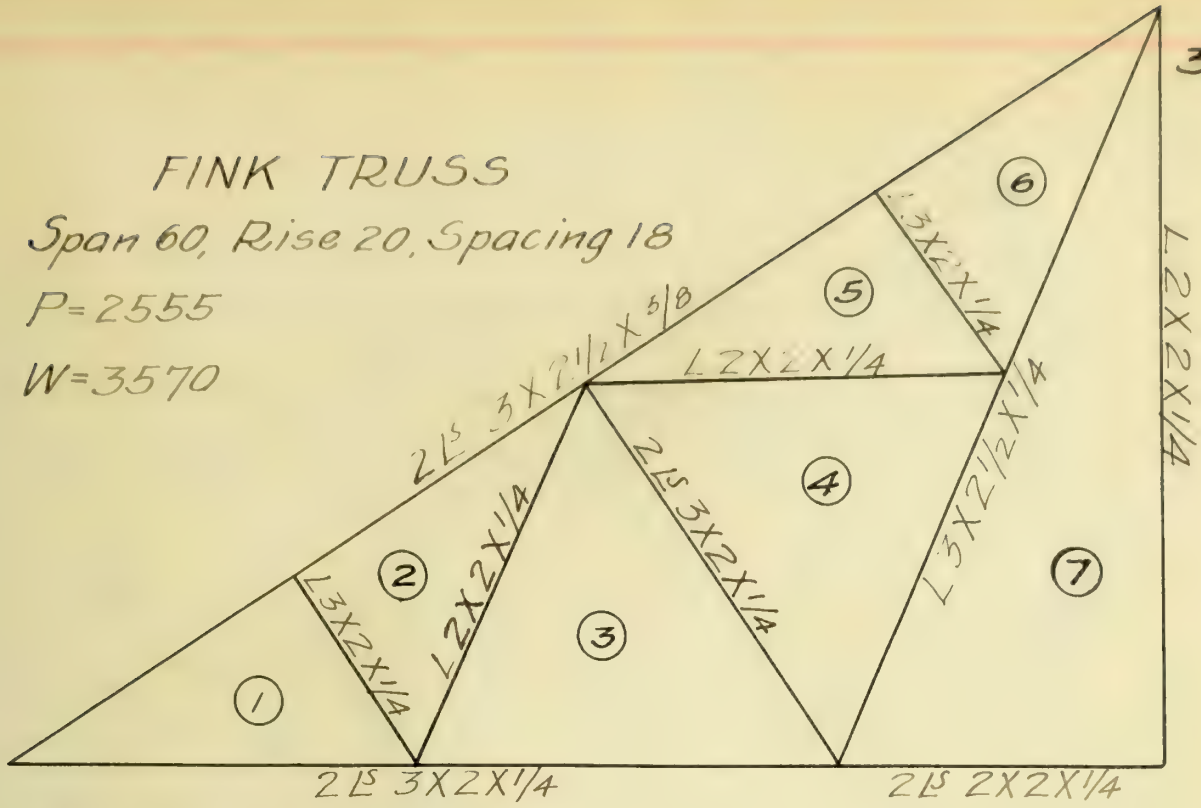
Size Purlin	No.	Length	Wt. per Foot	Weight	
6" I Beam	6	16	14.75	1416.0	
6" Channel	4	16	8.00	512.0	
				Weight Purlins	1928.0
				Sum of Purlin and Truss Weights	4080.3

FINK TRUSS

Span 60, Rise 20, Spacing 18

P = 2555

W = 3570



Member	Stress	Length	r	S	Area Required	Area Actual	w	No. of Pieces	Weight
Y1	27165	9	.93	7800	3.45	3.84	6.5	4	234.0
Y2	25880	9	.93	7800			6.5	4	234.0
Y5	24320	9	.93	7800			6.5	4	234.0
Y6	23080	9	.93	7800			6.5	4	234.0
X1	26055	10.8		15000	1.73	1.94	4	4	172.8
X3	21595	10.8		15000			4	4	172.8
X7	11340	16.8		15000	.75	1.50	3.19	2	107.2
1-2	5665	6	.43	5500	1.03	1.19	4	2	48.0
5-6	5665	6	.43	5500	1.03	1.19	4	2	48.0
3-4	11485	12	.89	5750	1.99	2.38	4	4	192.0
2-3	5155	10.8		15000	.35	.75	3.19	2	68.9
4-5	5155	10.8		15000	.35	.75	3.19	2	68.9
4-7	10260	10.8		15000	.69	1.12	3.19	2	97.2
6-7	15515	10.8		15000	1.04	1.12	3.19	2	97.2
7-7'		20.0					3.19	1	63.8
Weight of Members									2072.8
Details 14%									290.4
Total Weight Trusses									2363.2

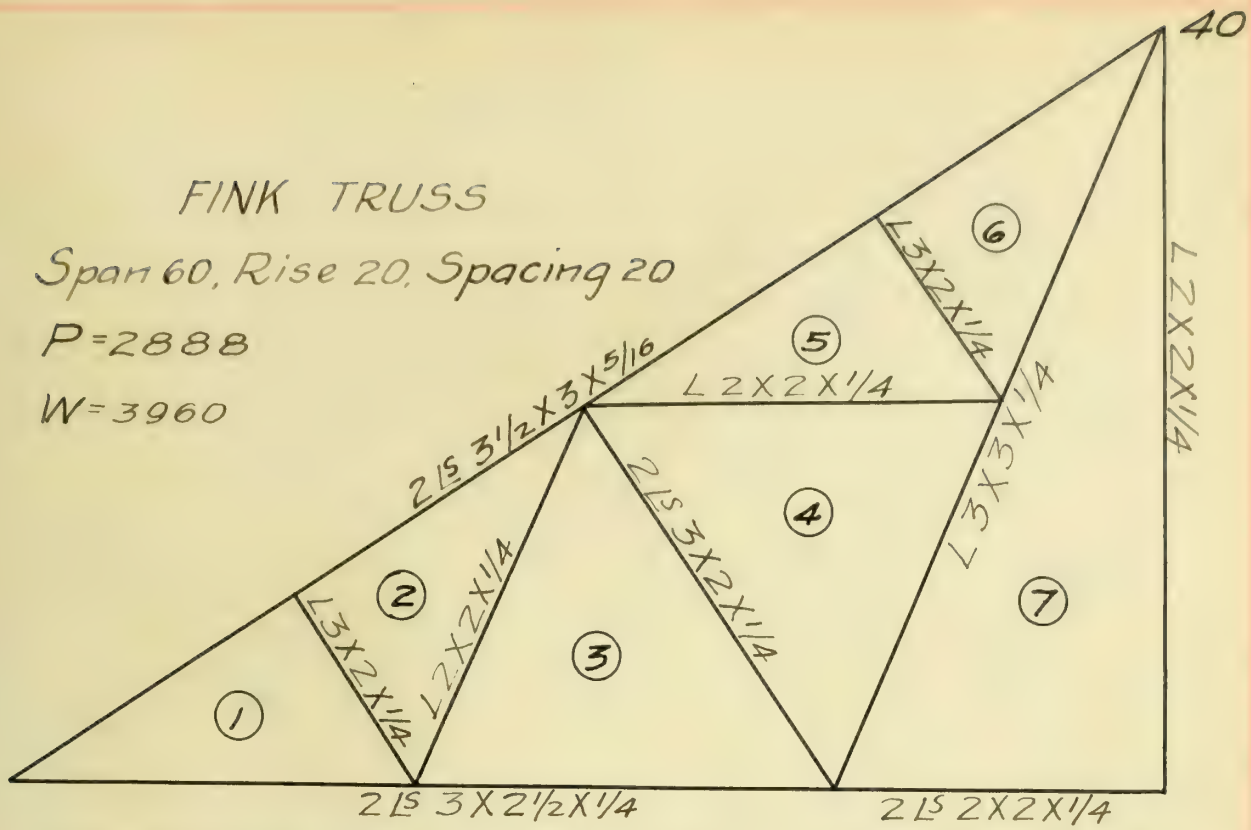
Size Purlins	No.	Length	Wt. per Foot	Weight	
7" I Beam	6	18	15.0	1620	
7" Channel	4	18	9.75	702	
Weight Purlins					2322.2
Sum of Truss and Purlin Wts					4685.4

FINK TRUSS

Span 60, Rise 20, Spacing 20

P = 2888

W = 3960



Member	Stress	l	r	S	Area Required	Area Actual	w	No. of Pieces	Weight
Y 1	30470	9	1.10	8405	3.62	3.87	6.6	4	237.6
Y 2	29025	9	1.10	8405			6.6	4	237.6
Y 5	27295	9	1.10	8405			6.6	4	237.6
Y 6	25850	9	1.10	8405			6.6	4	237.6
X 1	29955	10.8		15000	1.99	2.18	4.5	4	194.4
X 3	24085	10.8		15000			4.5	4	194.4
X 7	12625	16.8		15000	.85	1.50	3.19	2	107.2
5-6	6270	6	.43	5500	1.14	1.19	4	2	48.0
1-2	6270	6	.43	5500	1.14	1.19	4	2	48.0
3-4	12830	12	.89	5750	2.22	2.38	4	4	192.0
2-3	5875	10.8		15000	.39	.75	3.19	2	68.9
4-5	5875	10.8		15000	.39	.75	3.19	2	68.9
4-7	11460	10.8		15000	.77	1.23	3.19	4	105.9
6-7	17330	10.8		15000	1.16	1.23	3.19	4	105.9
7-7'		20.0					3.19	1	63.8
							Total Weight Members		2147.8
							Details 14%		300.9
							Total Weight Truss		2448.7

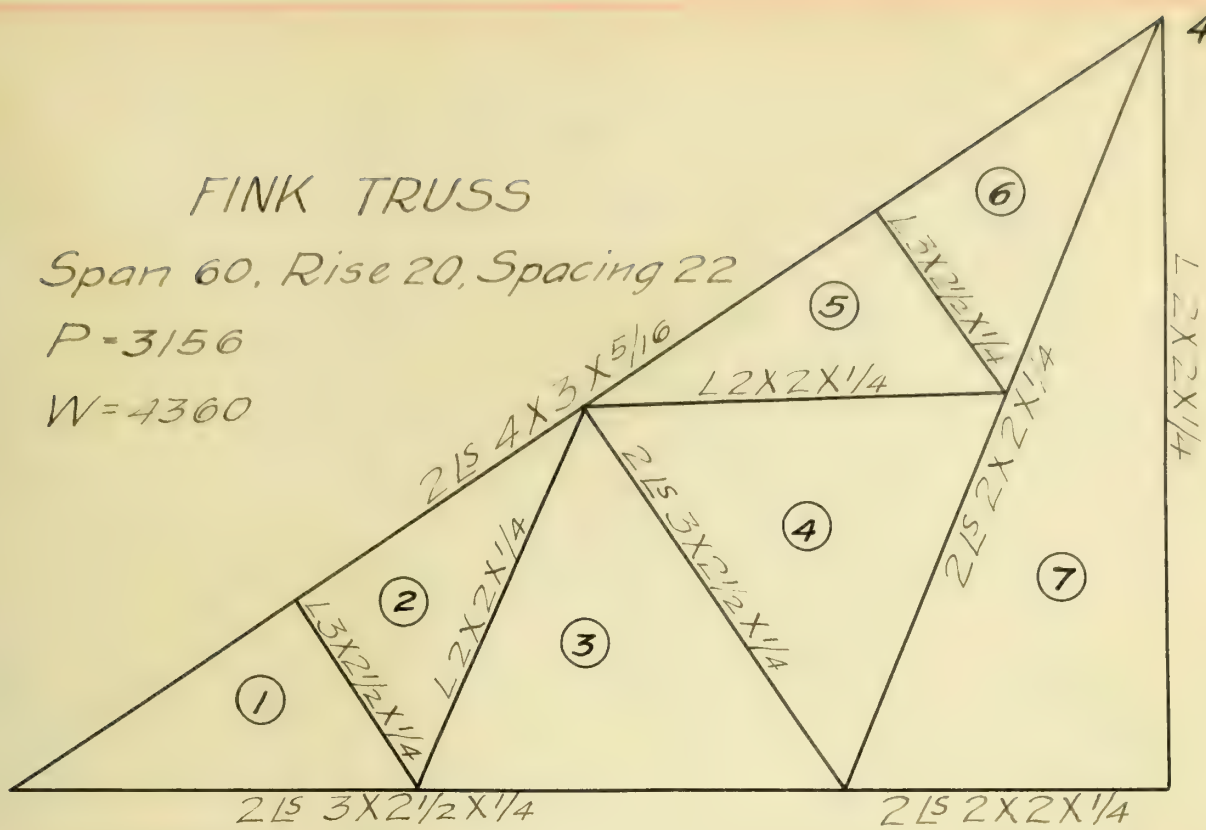
Size Purlin	No.	Length	Wt. per Foot	Weight	
8" I Beam	6	20	18.00	2180	
8" Channel	4	20	11.25	900	
				Weight Purlins	3080.0
				Sum Purlin and Truss Weights	5528.7

FINK TRUSS

Span 60, Rise 20, Spacing 22

P = 3156

W = 4360



Member	Stress	Length	r.	S	Area Required	Area Actual	Weight per Foot	No. of Pieces	Weight
Y1	33345	9	1.27	8955	3.72	4.18	7.1	4	255.6
Y2	31820	9	1.27	8955			7.1	4	255.6
Y5	29920	9	1.27	8955			7.1	4	255.6
Y6	28350	9	1.27	8955			7.1	4	255.6
X1	32855	10.8		15000	2.19	2.18	4.5	4	194.4
X3	26410	10.8		15000			4.5	4	194.4
X7	13830	16.8		15000	.93	1.50	3.19	2	107.2
1-2	6885	6	.43	5500	1.25	1.31	4.5	2	54.0
5-6	6885	6	.43	5500	1.25	1.31	4.5	2	54.0
3-4	14085	12	.89	5750	2.45	2.62	4.0	4	192.0
2-3	6450	10.8		15000	.43	.75	3.19	2	68.9
4-5	6450	10.8		15000	.43	.75	3.19	2	68.9
4-7	12585	10.8		15000	.84	1.88	3.19	4	137.8
6-7	19030	10.8		15000	1.27	1.88	3.19	4	137.8
7-7'		20.0					3.19	1	63.8
				Total Weight Members					2305.6
				Details 14%					316.4
				Total Weight Truss					2622.0

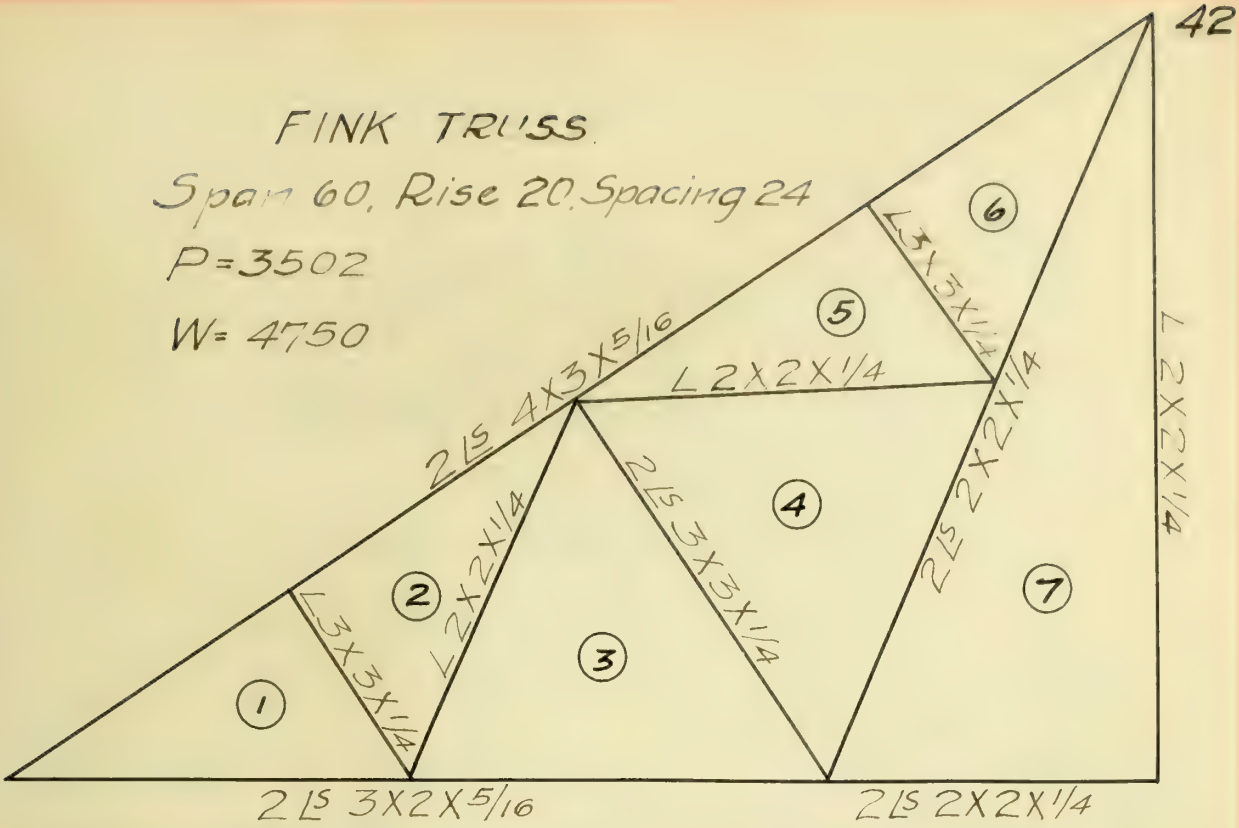
Size Purlin	No.	Length	Wt. per Foot	Weight	
8" I Beam	6	22	18.00	2376.0	
8" Channel	4	22	11.25	990.0	
Weight Purlins					3366.0
Sum of Purlin and Truss Wts					5988.0

FINK TRUSS

Span 60, Rise 20, Spacing 24

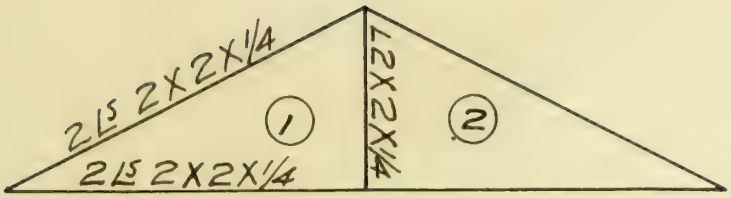
P = 3502

W = 4750



Member	Stress	Length	r.	S.	Area Required	Area Actual	Weight per Foot	No. of Pieces	Weight
Y1	36785	9	1.27	8955	4.11	4.18	7.1	4	255.6
Y2	35035	9	1.27	8955			7.1	4	255.6
Y5	32925	9	1.27	8955			7.1	4	255.6
Y6	31185	9	1.27	8955			7.1	4	255.6
X 1	36135	10.8		15000	2.41	2.38	5.0	4	216.0
X3	29060	10.8		15000			5.0	4	216.0
X7	15255	16.8		15000	1.02	1.50	3.19	2	107.2
1-2	7550	6	.43	5500	1.38	1.44	4.9	2	58.8
3-4	15455	12	.89	5750	2.70	2.88	4.9	4	235.2
5-6	7550	6	.43	5500	1.38	1.44	4.9	2	58.8
2-3	7075	10.8		15000	.47	.75	3.19	2	68.9
4-5	7075	10.8		15000	.47	.75	3.19	2	68.9
4-7	14305	10.8		15000	.96	1.88	3.19	4	137.8
6-7	20880	10.8		15000	1.39	1.88	3.19	4	137.8
7-7'		20.0					3.19	1	63.8
				Total Weight Main Members					2391.6
				Details 14%					334.1
				Total Weight Truss					2725.7

Size Purlin	No.	Length	Weight per Foot	Weight.	
9" I Beam	6	24	21.00	3024.0	
9" Channel	4	24	13.25	1272.0	
Weight Purlins					4296.0
Sum of Truss and Purlin Weights					7021.7



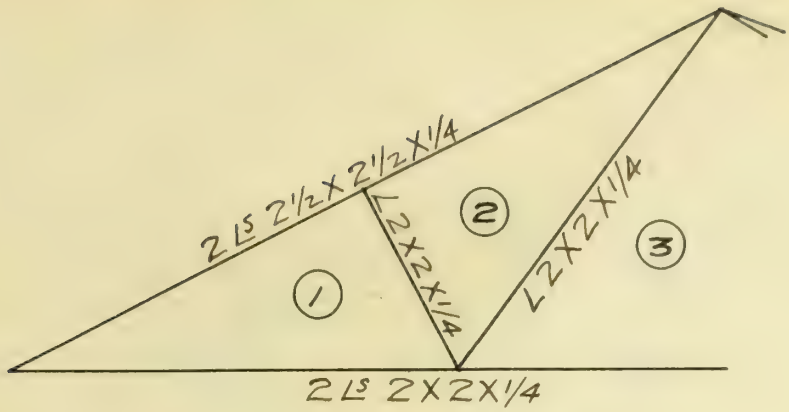
FINK TRUSS

Span 15 Rise 3¾ Spacing 14

P=2700 W=2125

Member	Stress	l	r	S	Area Required	Area Actual	w	No. of Pieces	Weight
Y1	4300	8.4	.61	5620	.75	1.88	3.19	4	107.2
X1	3550	15.0		15000	.24	1.50	3.19	2	115.7
1-2		3.75					3.19	1	11.8
Weight Main Members									234.7
Details 14%									32.9
Total Truss Weight									267.6

Size Purlin	No.	Length	Wt. per Foot	Weight	
5" Channel	4	14	6.5	364	
Purlin Weight					364.0
Combined Purlin and Truss Wt.					631.6



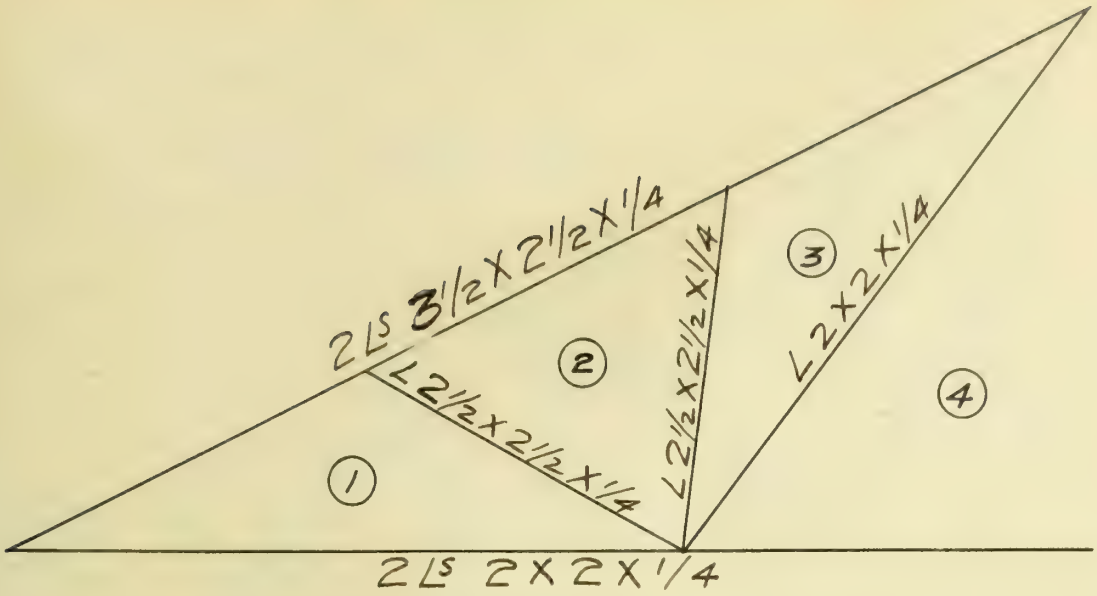
FINK TRUSS

Span 30 Rise 7½ Spacing 14

P = 2650 W = 2125

Member	Stress	l	r	S	Area Required	Area Actual	w	No. of Pieces	Weight
Y1	12570	8.4	.77	7050	1.78	2.38	4.0	4	134.4
Y2	11510	8.4	.77	7050		2.38	4.0	4	134.4
X1	11990	9.4		15000	.80	1.50	3.19	4	119.9
X3	7000	11.2		15000	.47	1.50	3.19	2	71.5
1-2	4510	4.2	.39	7115	.64	.94	3.19	2	26.8
2-3	4990	9.4		15000	.34	.75	3.19	2	60.0
Weight Main Members									547.0
Details 14%									76.6
Total Truss Weight									623.6

Size Purlins	No.	Length	Wt. per Foot	Weight	
6" I Beam	2	14	12.25	343	
6" Channel	4	14	8.00	448	
Purlin Weight					791.0
Combined Purlin and Truss Wt.					1414.6



TRUSS

Span 45 Rise 11¼ Spacing 14

P = 2716 W = 2125

Member	Stress	l	r	S	Area Required	Area Actual	w	No. of Pieces	Weight
Y1	22000	8.4	1.09	8645	2.55	2.88	4.9	4	164.6
Y2	17540	8.4	1.09	8645		2.88	4.9	4	164.6
Y3	19570	8.4	1.09	8645		2.88	4.9	4	164.6
X1	21660	14.1		15000	1.45	1.50	3.19	4	179.9
X4	10910	16.8		15000	1.45	1.50	3.19	2	107.2
1-2	5540	7.5	.49	4845	1.15	1.19	3.19	2	47.9
2-3	5540	7.5	.49	4845	1.15	1.19	3.19	2	47.9
3-4	10320	14.1		15000	.70	.75	3.19	2	89.9
Weight Main Members									966.6
Details 14%									135.3
Total Truss Weight									1101.9

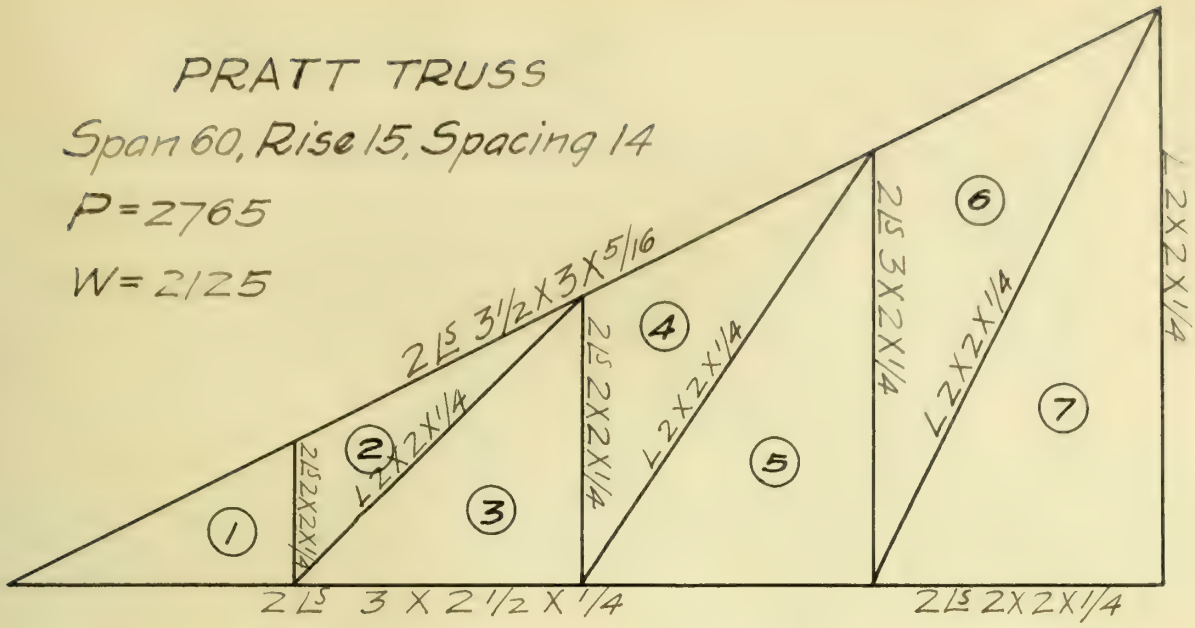
Size Purlin	No.	Length	Wt. per Foot	Weight	
6" I Beam	4	14	12.25	686.0	
6" Channel	4	14	8.00	448.0	
Purlin Weight					1134.0
Combined Truss and Purlin Wt.					2235.9

PRATT TRUSS

Span 60, Rise 15, Spacing 14

P = 2765

W = 2125



Member	Stress	l	r	S	Area Required	Area Actual	w	No. of Pieces	Weight
Y1	31160	8.4	1.10	8680	3.59	3.87	6.6	4	221.8
Y2	32210	8.4	1.10	8680	3.71		6.6	4	221.8
Y4	27400	8.4	1.10	8680			6.6	4	221.8
Y6	22920	8.4	1.10	8680			6.6	4	221.8
X1	29980	7.5		15000	1.99	2.19	4.5	4	135.0
X3	24480	7.5		15000			4.5	4	135.0
X5	19780	7.5		15000			4.5	4	135.0
X7	14670	15.0		15000	.99	1.50	3.19	2	95.7
1-2	5100	3.7	.61	9465	.54	1.88	3.19	4	47.2
3-4	7760	7.5	.61	6355	1.22	1.88	3.19	4	95.7
5-6	10200	11.3	.89	6150	1.66	2.38	4.00	4	180.8
3-2	7270	10.5		15000	.49	.75	3.19	2	67.0
4-5	9230	13.5		15000	.62	.75	3.19	2	86.1
6-7	11400	16.7		15000	.76	.75	3.19	2	106.5
7-7'		15.0					3.19	1	47.9
Weight Members									2019.1
Details 16.5%									331.1
Weight Trusses									2350.2

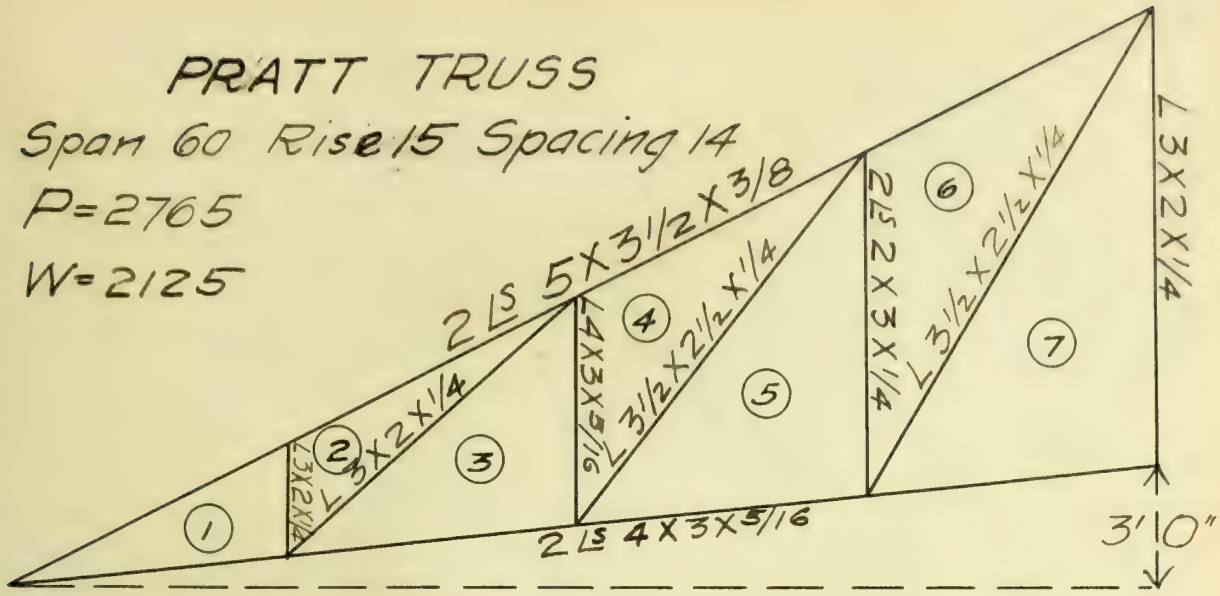
Size Purlin	No.	Length	Wt. per Foot	Weight	
6" I Beams	6	14	12.25	1029.0	
6" Channels	4	14	8.00	448.0	
Weight Purlins					1477.0
Sum of Purlin and Truss Weights					3827.2

PRATT TRUSS

Span 60 Rise 15 Spacing 14

P=2765

W=2125



Member	Stress	l	r	S	Area Required	Area Actual	w	No of Pieces	Weight
Y1	51320	8.4	1.46	9625	5.55	6.10	10.4	4	349.4
Y2	53450	8.4	1.46	9625		6.10	10.4	4	349.4
Y4	40160	8.4	1.46	9625		6.10	10.4	4	349.4
Y6	37200	8.4	1.46	9625		6.10	10.4	4	349.4
X1	50960	7.6		15000	3.40	3.64	7.1	4	215.8
X3	41630	7.6		15000		3.64	7.1	4	215.8
X5	32080	7.6		15000		3.64	7.1	4	215.8
X7	19200	7.6		15000		3.64	7.1	4	215.8
1-2	7330	3.0	.43	9015	.82	1.19	4.0	2	24.0
2-3	12630	10.0		15000	.84	.97	4.0	2	80.0
3-4	11160	6.0	.65	7885	1.42	2.09	7.1	2	85.2
4-5	15368	12.2		15000	1.02	1.22	4.9	2	119.6
5-6	15100	9.0	.89	7445	2.03	2.38	4.0	4	144.0
6-7	18320	14.7		15000	1.22	1.22	4.9	2	144.1
7-7'	4470	12.0		15000	.30	.97	4.0	1	48.0
Weight Main Members									2905.7
Details 20%									581.1
Total Truss Weight.									3486.8

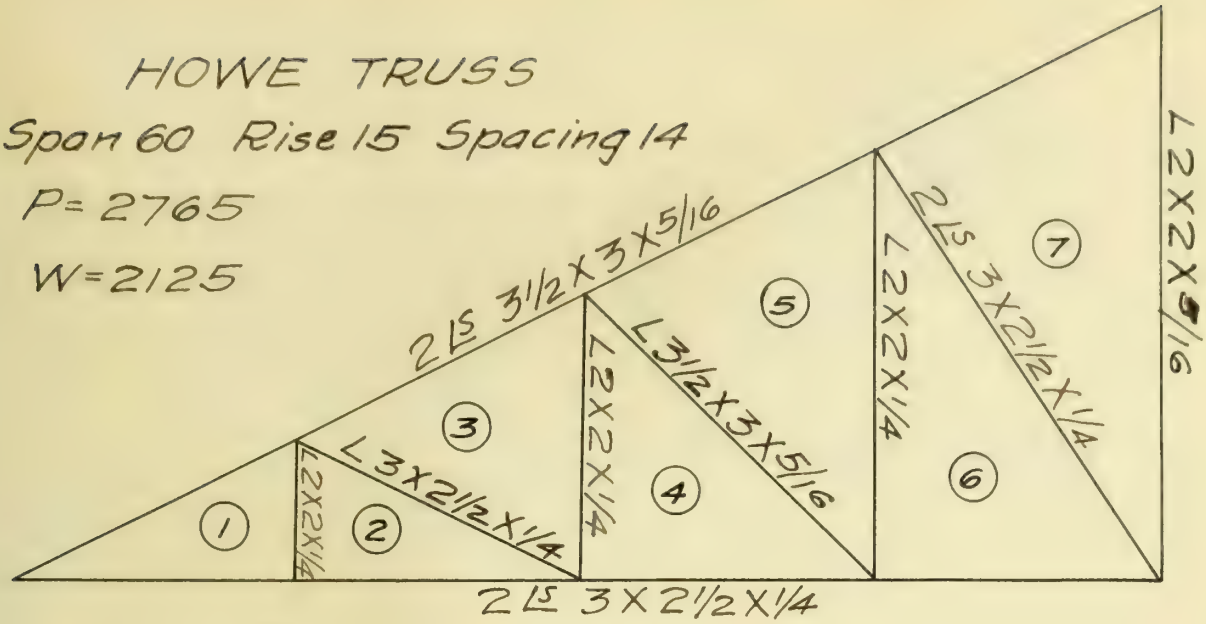
Size Purlin	No.	Length	Wt. per Foot	Weight	
6" I Beam	6	14	12.25	1029.0	
6" Channel	4	14	8.00	448.0	
Purlin Weight					1477.0
Combined Purlin and Truss Wt.					4963.8

HOWE TRUSS

Span 60 Rise 15 Spacing 14

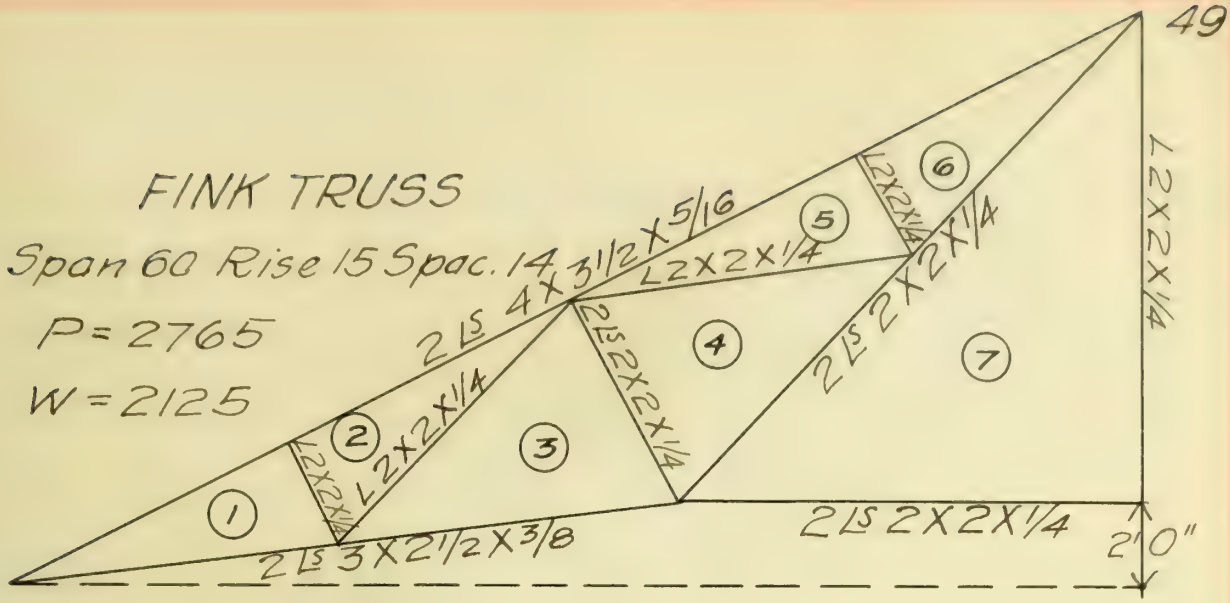
P = 2765

W = 2125



Member	Stress	l	r	S	Area Required	Area Actual	w	No. of Pieces	Weight
Y1	31160	8.4	1.10	8680	3.59	3.87	6.6	4	221.8
Y3	26600	8.4	1.10	8680		3.87	6.6	4	221.8
Y5	22100	8.4	1.10	8680		3.87	6.6	4	221.8
Y7	17330	8.4	1.10	8680		3.87	6.6	4	221.8
X1	29555	7.5		15000	2.00	2.19	4.5	4	135.0
X2	29555	7.5		15000	2.00	2.19	4.5	4	135.0
X4	25090	7.5		15000	1.67	2.19	4.5	4	135.0
X6	20000	7.5		15000	1.34	2.19	4.5	4	135.0
1-2		3.7		15000		.75	3.19	2	23.6
2-3	5800	8.4	.53	4575	1.27	1.31	4.5	2	75.6
3-4	2660	7.5		15000	.17	.75	3.19	2	47.9
4-5	7270	10.7	.63	4000	1.82	1.93	6.6	2	141.2
5-6	5100	11.3		15000	.34	.75	3.19	2	72.1
6-7	9230	13.6	.95	5340	1.73	2.62	4.5	4	244.8
7-8	11900	15.0		15000	.80	.92	3.92	2	58.8
Weight Main Members									2091.2
Details — 16%									334.6
Total Truss Weight									2425.8

Size Purlin	No.	Length	Wt. per Foot	Weight	
6" I Beam	6	14	12.25	1029.0	
6" Channel	4	14	8.00	448.0	
Purlin Weight					1477.0
Combined Truss and Purlin Wt.					3902.8



Member	Stress	l	r	S	Area Required	Area Actual	w	No. of Pieces	Weight
Y1	40890	8.4	1.26	9170	4.46	4.50	7.6	4	255.4
Y2	39500	8.4	1.26	9170		4.50	7.6	4	255.4
Y5	38400	8.4	1.26	9170		4.50	7.6	4	255.4
Y6	37300	8.4	1.26	9170		4.50	7.6	4	255.4
X1	47270	8.9		15000	3.16	3.18	6.5	4	231.4
X3	32400	8.9		15000	2.16	3.18	6.5	4	231.4
X7	16760	24.5		15000	1.12	1.44	3.19	4	156.3
2-3	6780	8.9		15000	.45	.75	3.19	2	56.8
4-5	6780	8.9		15000	.45	.75	3.19	2	56.8
4-7	6780	9.0		15000	.45	1.50	3.19	4	114.8
6-7	20100	9.0		15000	1.34	1.50	3.19	4	114.8
1-2	4610	3.1	.39	8500	.54	.94	3.19	2	197.8
5-6	4610	3.1	.39	8500	.54	.94	3.19	2	197.8
3-4	9220	6.1	.61	7500	1.23	1.50	3.19	4	77.8
7-7'		15.0					3.19	2	47.8
Weight Main Members									2505.1
Details 20%									505.0
Total Truss Weight									3010.1

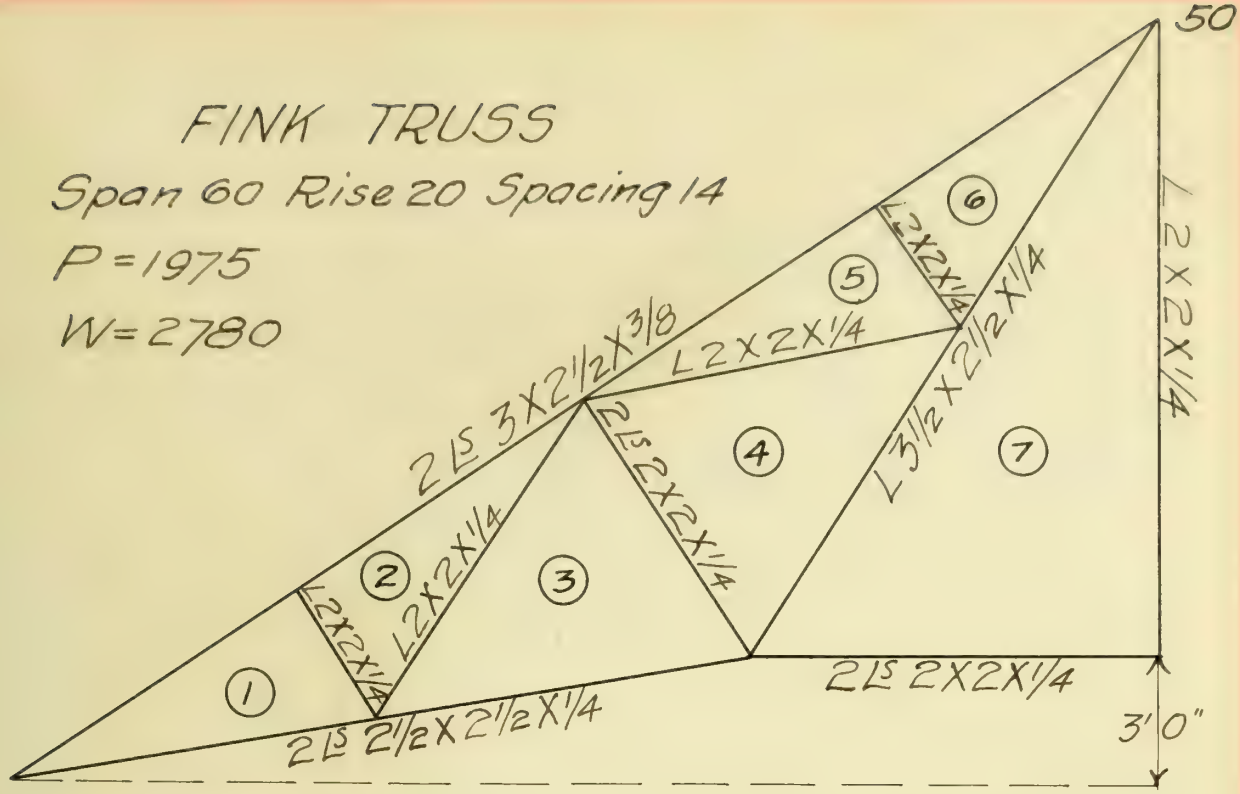
Size Purlin	No.	Length	Wt. per Foot	Weight	
6" I Beam	6	14	12.25	1029	
6" Channel	4	14	8.00	448	
Purlin Weight					1477.0
Combined Purlin and Truss Wt					4487.1

FINK TRUSS

Span 60 Rise 20 Spacing 14

P = 1975

W = 2780



Member	Stress	l	r	S	Area. Required	Area. Actual	w	No. of Pieces	Weight
Y1	28430	9.0	.93	7665	3.71	3.84	6.5	4	234.0
Y2	27250	9.0	.93	7665		3.84	6.5	4	234.0
Y5	26250	9.0	.93	7665		3.84	6.5	4	234.0
Y6	25270	9.0	.93	7665		3.84	6.5	4	234.0
X1	27250	9.9		15000	1.82	1.94	4.0	4	158.4
X3	21940	9.9		15000	1.47	1.94	4.0	4	158.4
X7	10450	20.6		15000	.70	1.50	3.19	2	131.1
1-2	4360	4.2	.39	6115	.72	.94	3.19	2	26.8
2-3	5310	9.9		15000	.36	.75	3.19	2	63.2
3-4	8920	8.5	.61	5615	1.59	1.88	3.19	4	108.5
4-5	5310	9.9		15000	.36	.75	3.19	2	63.2
5-6	4360	4.2	.39	6115	.72	.94	3.19	2	26.8
6-7	17680	9.9		15000	1.18	1.22	4.9	2	97.0
4-7	12840	9.9		15000	.86	1.22	4.9	2	97.0
7-8		7.0				.94	3.19	1	54.2
Weight Main Members									1920.6
Details 18%									345.6
Total Truss Weight									2266.2

Size Purlin	No.	Length	Wt. per Foot	Weight	
6" I Beam	6	14	12.25	1029.0	
6" Channel	4	14	8.00	448.0	
Purlin Weight					1477.0
Combined Purlin and Truss Wt.					3743.2

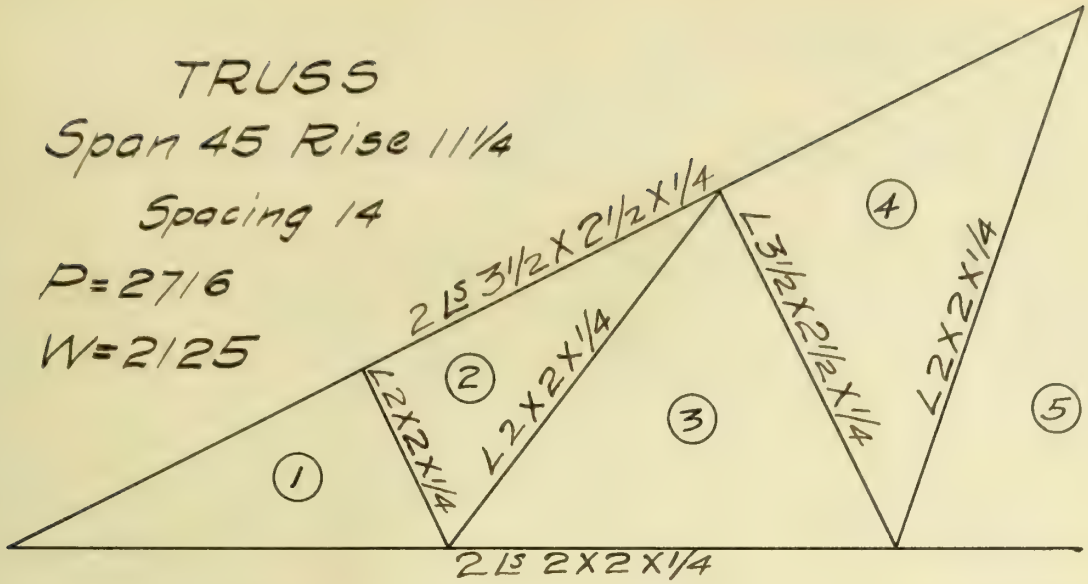
TRUSS

Span 45 Rise 11 1/4

Spacing 14

P = 2716

W = 2125



Member	Stress	l	r	S	Area Required	Area Actual	w	No. of Pieces	Weight
Y1	22000	8.4	1.09	8645	2.54	2.88	4.9	4	164.6
Y2	20930	8.4	1.09	8645		2.88	4.9	4	164.6
Y4	15270	8.4	1.0.9	8645		2.88	4.9	4	164.6
X1	21020	9.4		15000	1.40	1.50	3.19	4	~~164.6~~
X3	15970	9.4		15000	1.07	1.50	3.19	4	119.9
X5	11190	7.8		15000	.75	1.50	3.19	4	119.9
1-2	4570	4.2	.39	6115	.75	.94	3.19	2	99.5
2-3	4060	8.4		15000	.27	.75	3.19	2	26.8
3-4	6720	8.4	.54	4725	1.42	1.44	4.9	2	53.5
4-5	6780	12.0		15000	.46	.75	3.19	2	82.3
									76.6
Weight Main Members									1072.3
Details 14%									150.1
Total Truss Weight									1222.4

Size Purlin	No.	Length	Wt. per Foot	Weight	
6" I Beam	4	14	12.25	686.0	
6" Channel	4	14	8.00	448.0	
Purlin Weight					1134.0
Combined Truss and Purlin Wt.					2356.4

— SUMMARY OF RESULTS —

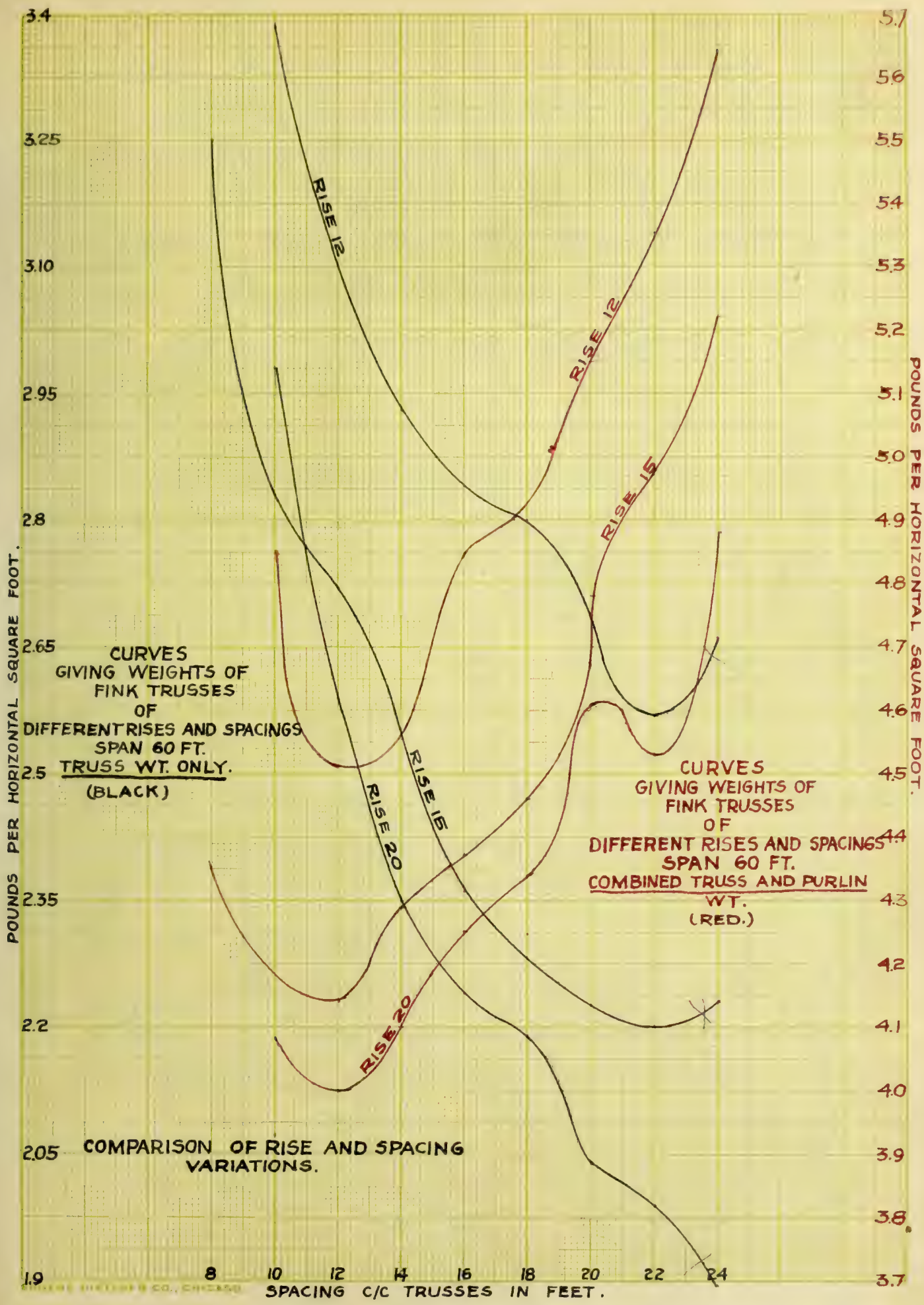
No. Truss	Spacing	Rise	Total Weight.				Weight in lbs. per horizontal sq. ft. of roof area covered.			
			Main Members	Truss	Purlins	Truss and Purlins	Main Members	Truss	Purlins	Truss and Purlins
26	8	15	1370	1561	528	2089	2.85	3.25	1.10	4.35
18	10	12	1691	2030	720	2749	2.82	3.39	1.20	4.85
27	10	15	1490	1699	660	2359	2.49	2.83	1.10	3.93
35	10	20	1567	1786	660	2446	2.62	2.98	1.10	4.08
19	12	12	1863	2236	1014	3250	2.58	3.10	1.41	4.51
28	12	15	1716	1956	1014	2970	2.38	2.72	1.41	4.14
36	12	20	1639	1869	1014	2883	2.28	2.59	1.41	4.00
20	14	12	2047	2456	1477	3933	2.44	2.93	1.76	4.56
29	14	15	1880	2144	1477	3621	2.24	2.54	1.76	4.29
37	14	20	1728	1970	1477	3447	2.05	2.35	1.76	4.10
21	16	12	2274	2728	1928	4656	2.37	2.84	2.01	4.85
30	16	15	1993	2272	1928	4200	2.08	2.36	2.01	4.37
38	16	20	1887	2152	1928	4080	1.97	2.24	2.01	4.25
22	18	12	2496	2995	2322	5317	2.31	2.80	2.15	4.92
31	18	15	2188	2494	2322	4816	2.03	2.31	2.15	4.46
39	18	20	2073	2363	2322	4685	1.92	2.19	2.15	4.34
23	20	12	2626	3152	3080	6231	2.09	2.63	2.57	5.16
32	20	15	2333	2660	3080	5740	1.96	2.22	2.57	4.78
40	20	20	2148	2449	3080	5529	1.78	2.04	2.57	4.61
24	22	12	2831	3397	3663	7060	2.14	2.57	2.77	5.35
33	22	15	2551	2907	3663	6570	1.93	2.20	2.77	4.98
41	22	20	2306	2622	3366	5988	1.75	1.99	2.55	4.53
25	24	12	3191	3829	4296	8125	2.22	2.66	2.99	5.64
34	24	15	2824	3219	4296	7515	1.96	2.23	2.99	5.22
42	24	20	2392	2726	4296	7022	1.66	1.89	2.99	4.88
43	14	$3\frac{3}{4}$	237	267	364	631	1.13	1.27	1.73	3.01
44	14	$7\frac{1}{2}$	547	623	791	1414	1.29	1.49	1.88	3.37
45	14	$11\frac{1}{4}$	967	1102	1134	2236	1.53	1.75	1.80	3.55
46	14	15	2019	2350	1477	3827	2.40	2.80	1.76	4.56
47	14	15	2906	3487	1477	4963	3.46	4.15	1.76	5.91
48	14	15	2091	2426	1477	3903	2.49	2.88	1.76	4.64
49	14	15	2505	3010	1477	4487	2.98	3.58	1.76	5.34
50	14	20	1921	2266	1477	3743	2.29	2.70	1.76	4.45
51	14	$11\frac{1}{4}$	1072	1222	1134	2356	1.70	1.94	1.80	3.73

Conclusions.

The following results are readily arrived at from a comparison of the results given on the preceding pages, and from an inspection of the curves plotted corresponding to these values.

a) Comparison as to rise. It will be noticed that the least amount of metal has been used in trusses of 20 feet rise, the span and spacing being constant, with the exception of the three roofs with a truss spacing of 10 feet, where a 15 feet rise seems to be the most economical.

The difference in weight between trusses of 1/3 and 1/4 pitch is very slight, hence the truss with the 15 feet rise is to be considered the best, since the 20 feet rise involves considerable more roof area, the cost and painting of which would be much greater than the difference in the cost of trusses having a 1/4 and 1/3 pitch respectively. The weight of purlins generally remains constant for trusses of different rises but of the same spacing.

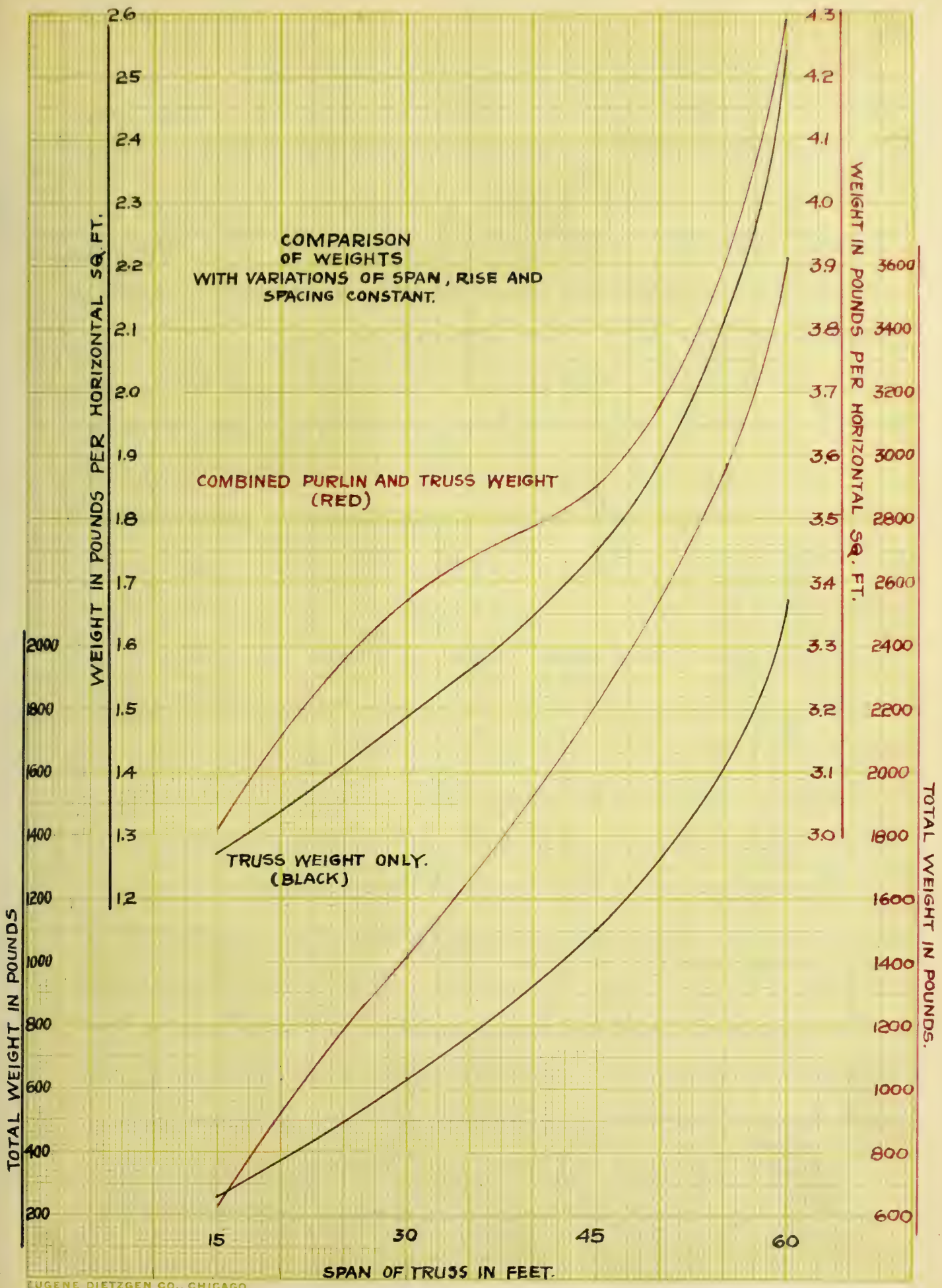

CURVES
GIVING WEIGHTS OF
FINK TRUSSES
OF
DIFFERENT RISES AND SPACINGS
SPAN 60 FT.
TRUSS WT. ONLY.
(BLACK)
CURVES
GIVING WEIGHTS OF
FINK TRUSSES
OF
DIFFERENT RISES AND SPACINGS
SPAN 60 FT.
COMBINED TRUSS AND PURLIN
WT.
(RED.)
RISE 12
RISE 15
RISE 20
RISE 12
RISE 15
RISE 20
COMPARISON OF RISE AND SPACING
VARIATIONS.
POUNDS PER HORIZONTAL SQUARE FOOT.
POUNDS PER HORIZONTAL SQUARE FOOT.
SPACING C/C TRUSSES IN FEET.
3.4
3.25
3.10
2.95
2.8
2.65
2.5
2.35
2.2
2.05
1.9
5.7
5.6
5.5
5.4
5.3
5.2
5.1
5.0
4.9
4.8
4.7
4.6
4.5
4.4
4.3
4.2
4.1
4.0
3.9
3.8
3.7
8
10
12
14
16
18
20
22
24

hence the most economical truss weight would be the most economical combined truss and purlin weight

The 1/5 pitch truss besides being heavier, has also the disadvantage of not being able to shed rain and snow as effectively as in the trusses with greater rise.

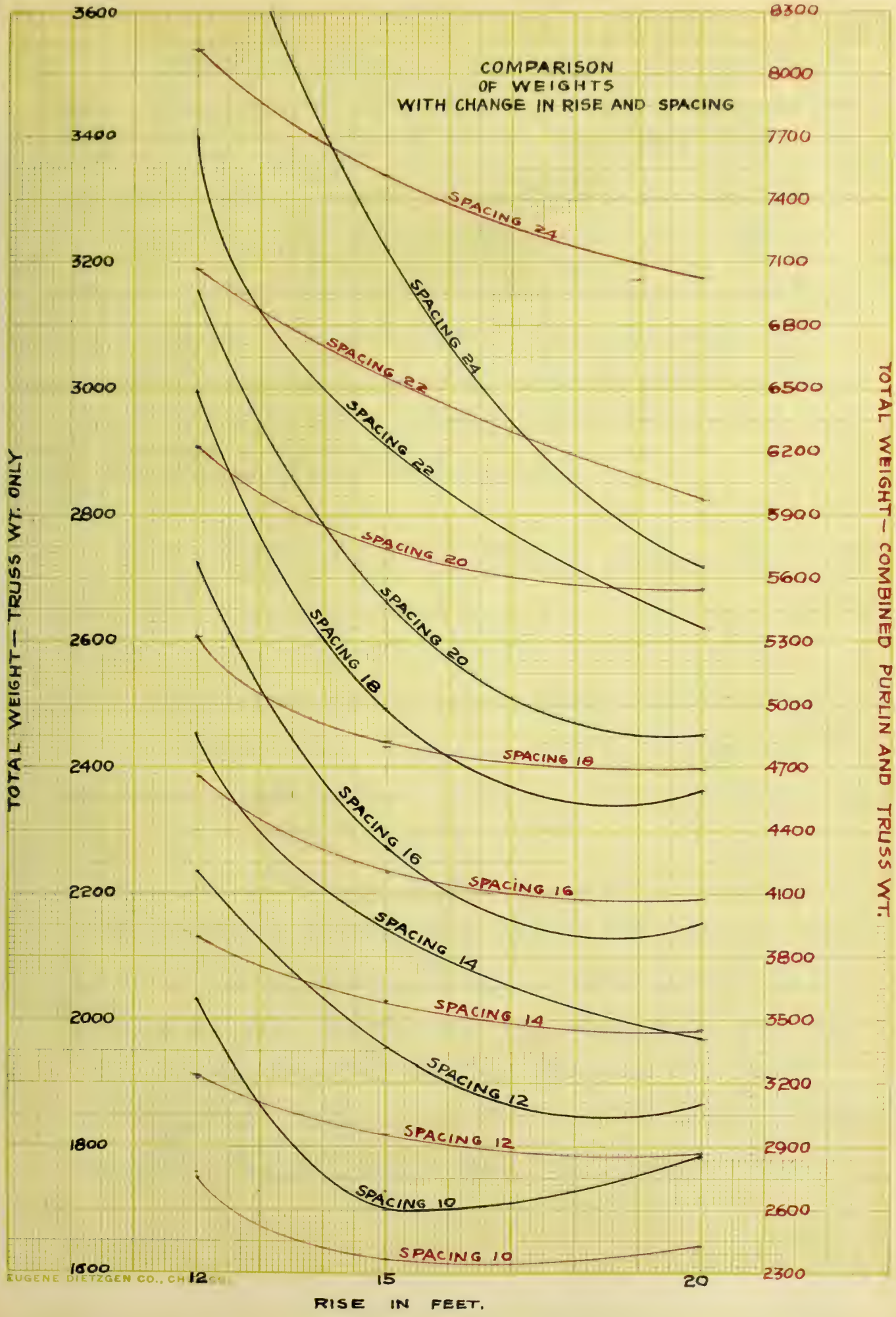
b) <u>Comparison as to span</u>. But one series of trusses, numbers 43, 44, 45 and 29 of 15, 30, 45, and 60 feet span respectively, was investigated as to span, pitch and spacing constant, but the results obtained show conclusively, that the truss weight as well as combined truss and purlin weight increases as the span. The cost of shopwork will increase proportionately to the increase of weight.

In trusses of over 60 feet span, where rollers are used, there would be a decided increase in weight.



EUGENE DIETZGEN CO., CHICAGO.

c) Comparison as to spacing. The weight of the roof truss increases with the increase in spacing, but the weight per square foot of horizontal surface covered decreases at the same time. However, the purlins must be considered. The increase of weight of purlins per horizontal square foot exceeds the decrease of weight in the truss, hence the combined weight of truss and purlins increases as the spacing increases. Therefore, from the standpoint of economy of metal, it would be desirable to place the trusses as near together as possible. This however would not be true practically, since the cost of erection for trusses spaced 10 feet would probably be as much as for trusses spaced twice that distance. No definite statement can be made on the subject of spacing, until the cost of erection is obtained, which is rather difficult, due to the different conditions and methods of erecting structural work. It seems that 16 feet would be about the correct spacing for a span of 60 feet.


COMPARISON
OF WEIGHTS
WITH CHANGE IN RISE AND SPACING
TOTAL WEIGHT— TRUSS WT. ONLY
TOTAL WEIGHT— COMBINED PURLIN AND TRUSS WT.
RISE IN FEET.
3600
3400
3200
3000
2800
2600
2400
2200
2000
1800
1600
8300
8000
7700
7400
7100
6800
6500
6200
5900
5600
5300
5000
4700
4400
4100
3800
3500
3200
2900
2600
2300
12
15
20
SPACING 24
SPACING 22
SPACING 20
SPACING 18
SPACING 16
SPACING 14
SPACING 12
SPACING 10
SPACING 24
SPACING 22
SPACING 20
SPACING 18
SPACING 16
SPACING 14
SPACING 12
SPACING 10
EUGENE DIETZGEN CO., CHICAGO

In the cases of most buildings, the spacing of trusses would depend on the spacing of columns, on the situation of pilasters, and very often on the fenestration. In large buildings, where large quantities of steel are used for beams and girders, the spacing of roof trusses would not be considered, as this would depend on the economic spacing of columns.

d) Effect of inclined lower chord.

In the trusses considered, viz. numbers 47, 49 and 50, the following have been the percentages of increase in truss weight over the same trusses with horizontal chords, numbers 46, 29 and 36 respectively

48% 41% 14%

Besides the increased weight, trusses which have inclined lower chords are apt to have poor end connections, the lower chord not resting directly on the bed plate for the entire length of that plate. The only advantage to be obtained is the slight increase of head room.

e) Comparison of types. It has been found that the Fink truss is the most economical in amount of metal. Furthermore it is more easily detailed, since several of the gusset plates are of the same shape and size and in the case of the 1/4 pitch truss, many of the members are of the same length.

Taking trusses of 60 feet span, 15 feet rise and 14 feet spacing the following are the weights

No. 29 - Fink - 2143.9# - 100%
46 - Pratt - 2350.2# - 111%
48 - Howe - 2425.5# - 114%

Comparing trusses numbers 50 and 47, Fink and Pratt trusses respectively of 60 feet span, 15 feet rise and 14 feet spacing, with a rise of 3 feet in the lower chord, we have

No. 50 - Fink - 2266.2# - 100%
47 - Pratt - 3486.8# - 154%

PRATT TRUSS

SPAN 60'0" RISE 15'0" SPACING 14'0"

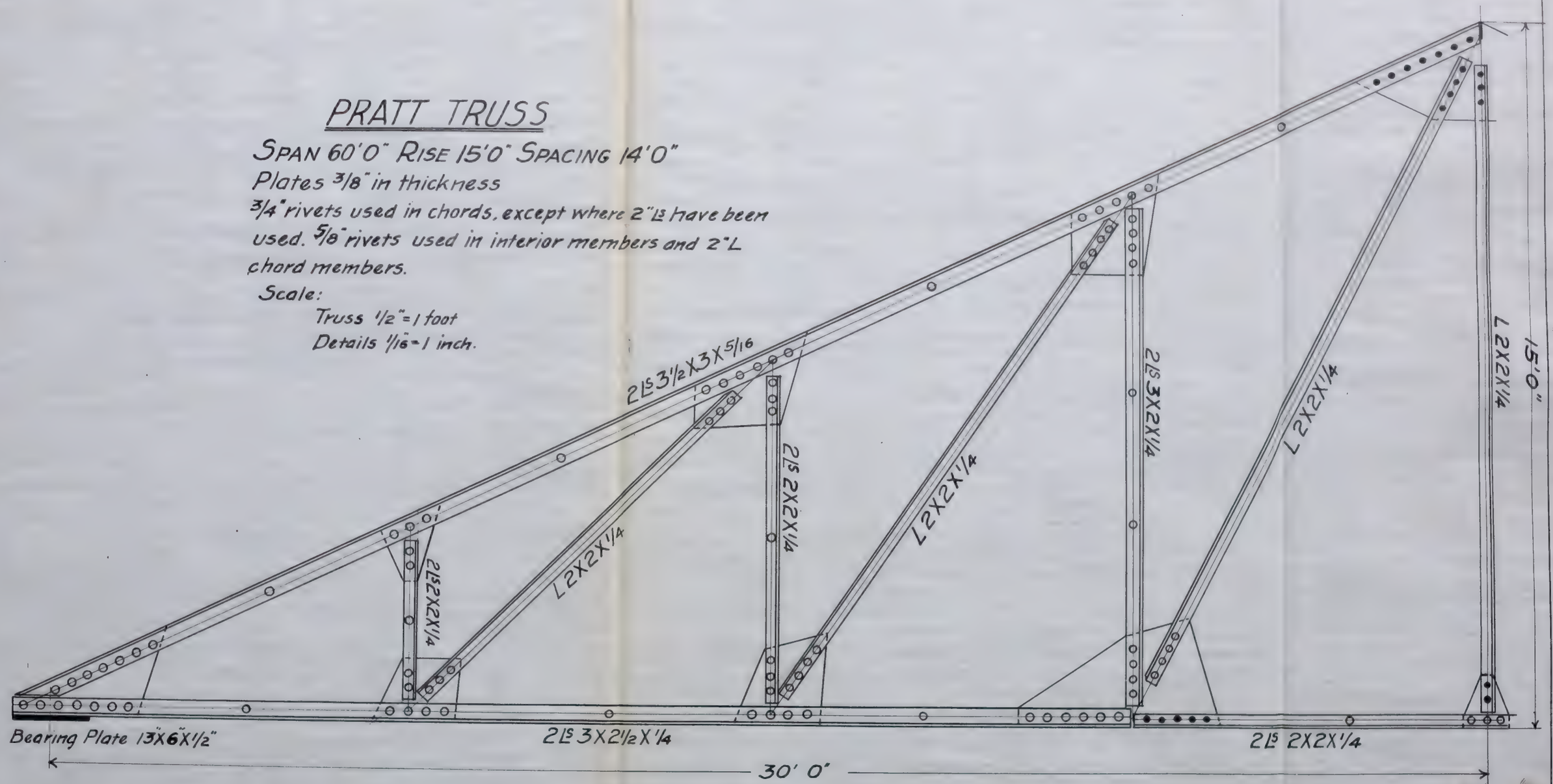
Plates 3/8" in thickness

3/4" rivets used in chords, except where 2" Ls have been used. 5/8" rivets used in interior members and 2" L chord members.

Scale:

Truss 1/2" = 1 foot

Details 1/16" = 1 inch.



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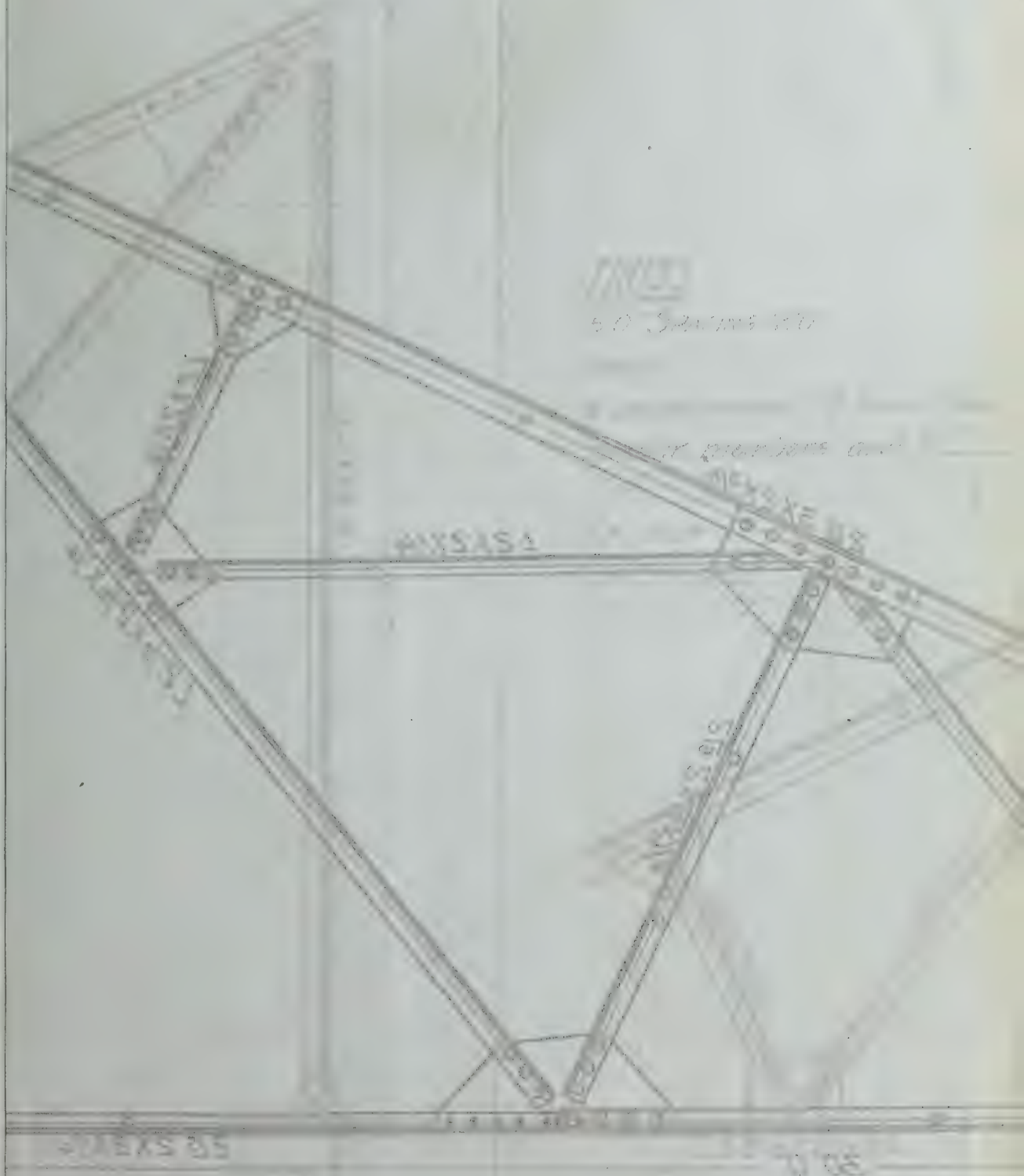


FINK TRUSS

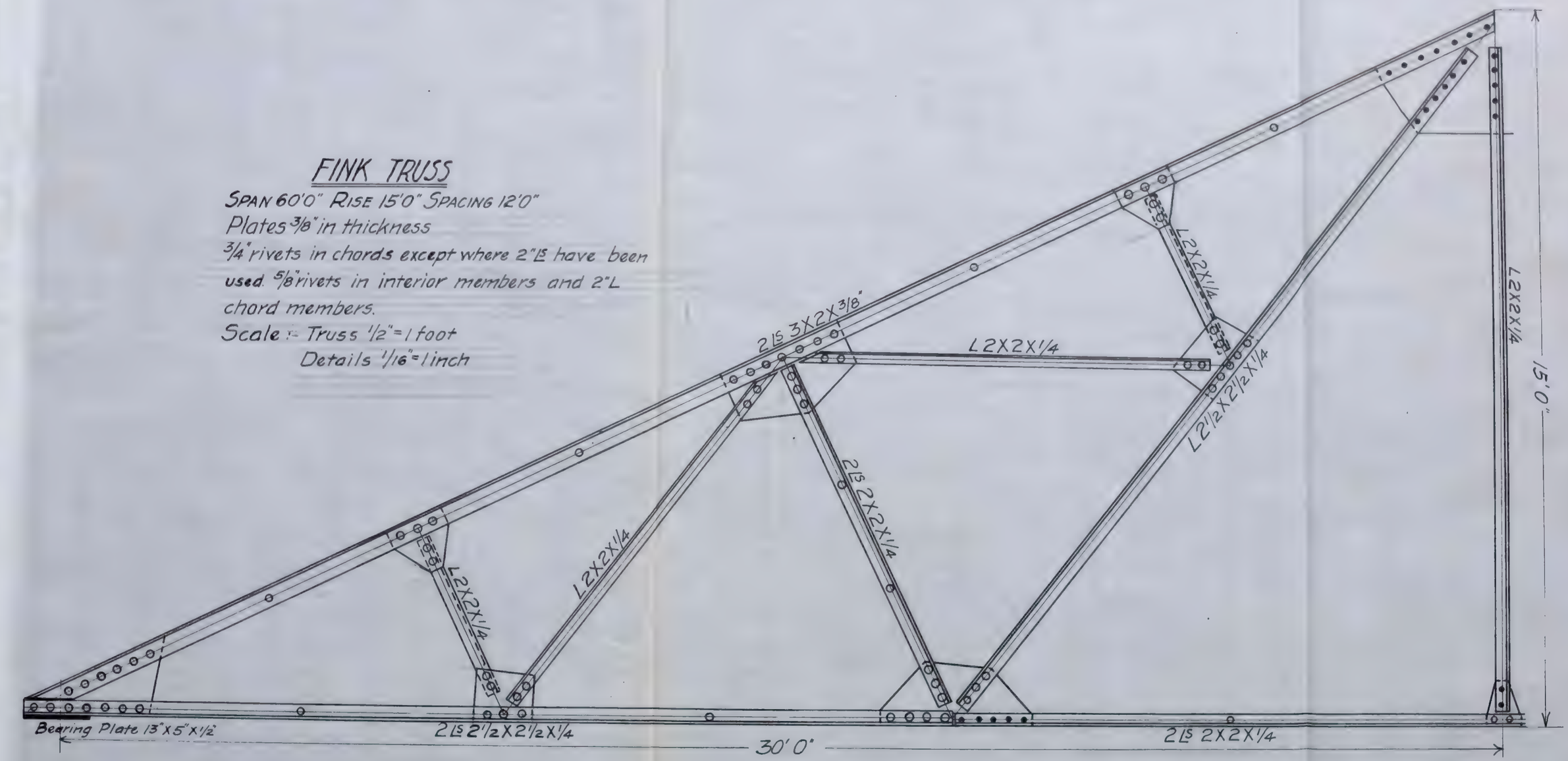
SPAN 60'0" RISE 15'0" SPACING 12'0"

Plates 3/8" in thickness

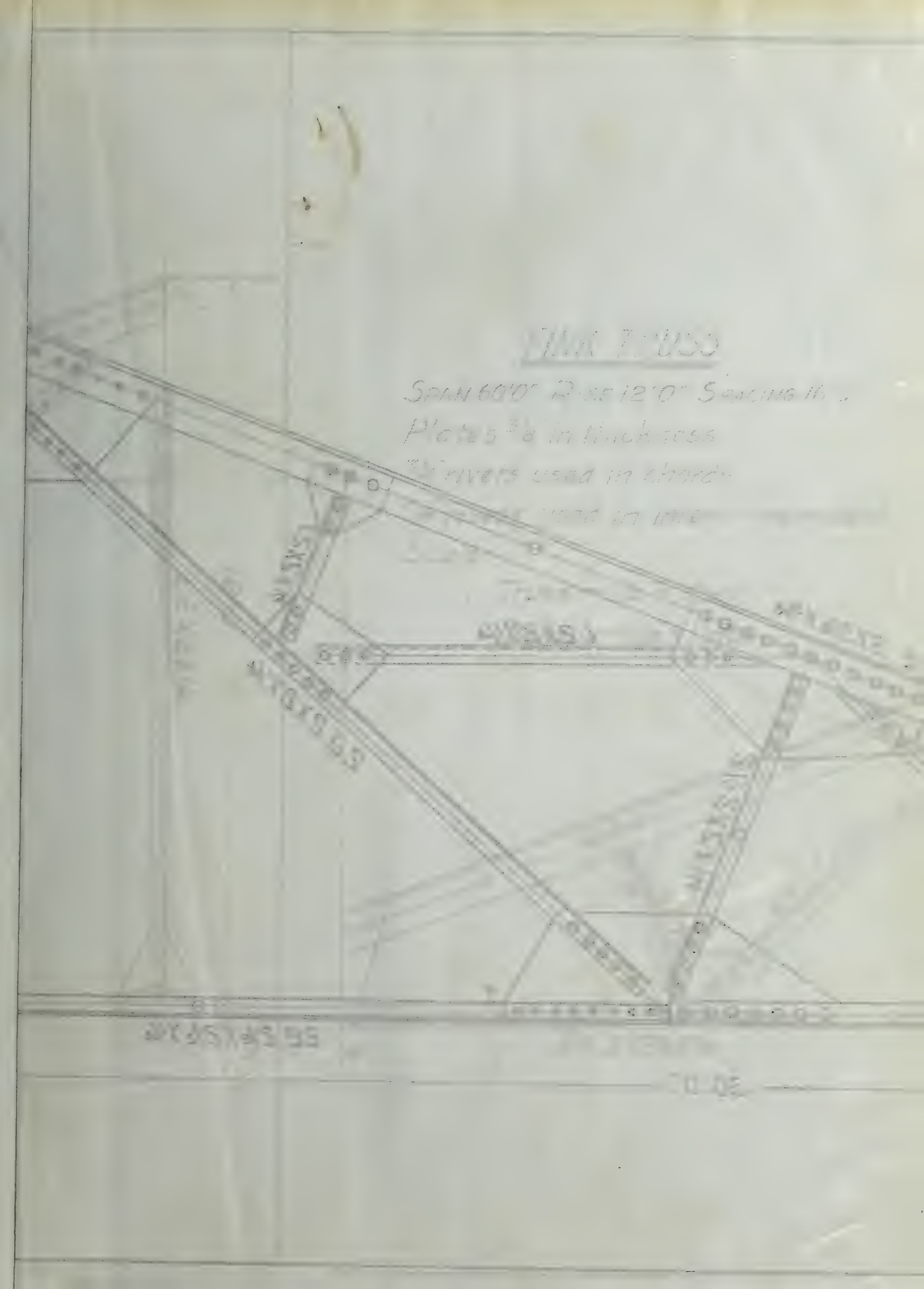
3/4" rivets in chords except where 2" Ls have been used. 5/8" rivets in interior members and 2" L chord members.

Scale :- Truss 1/2" = 1 foot

Details 1/16" = 1 inch



H. H. WOLLESON.


Span 60'0"
Plates
Rivets used in chords

FINK TRUSS

SPAN 60'0" RISE 12'0" SPACING 16'0"

Plates 3/8" in thickness.

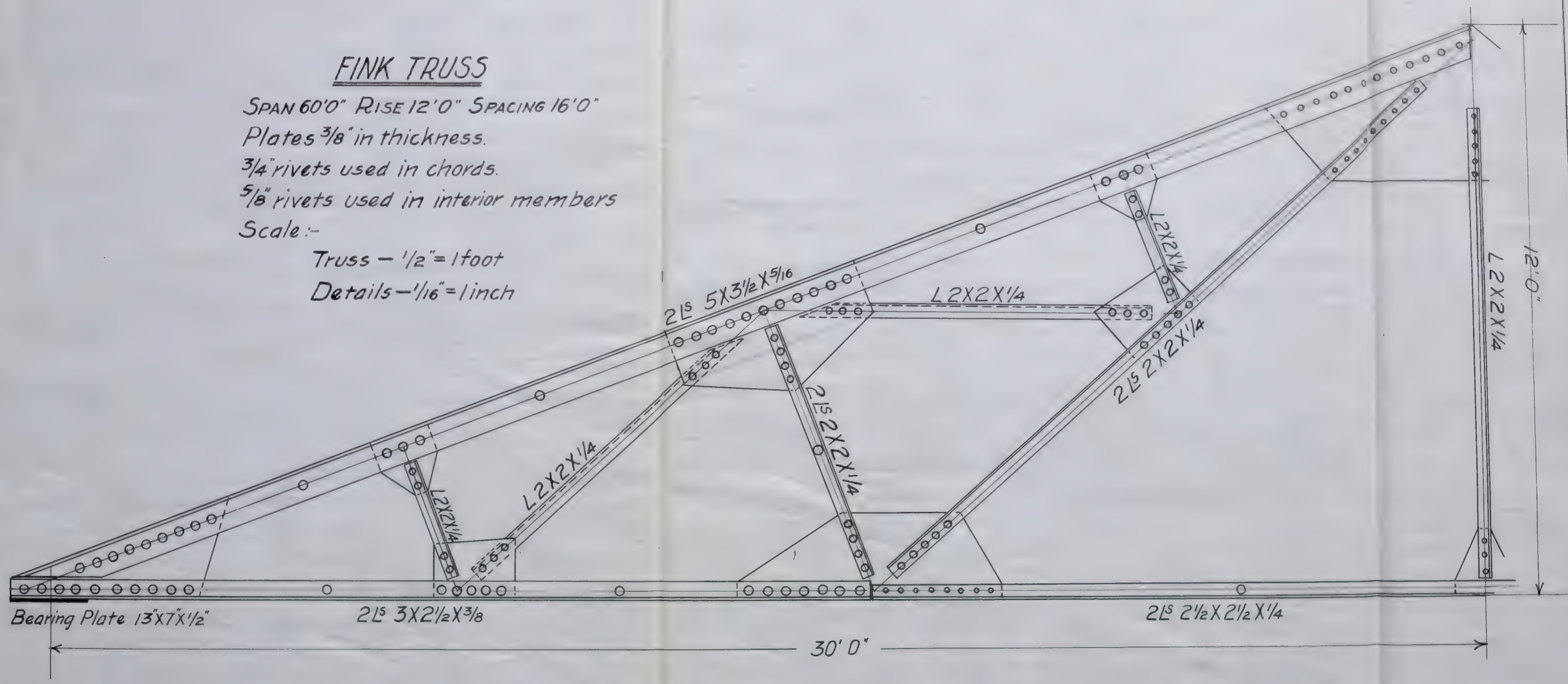
3/4" rivets used in chords.

5/8" rivets used in interior members

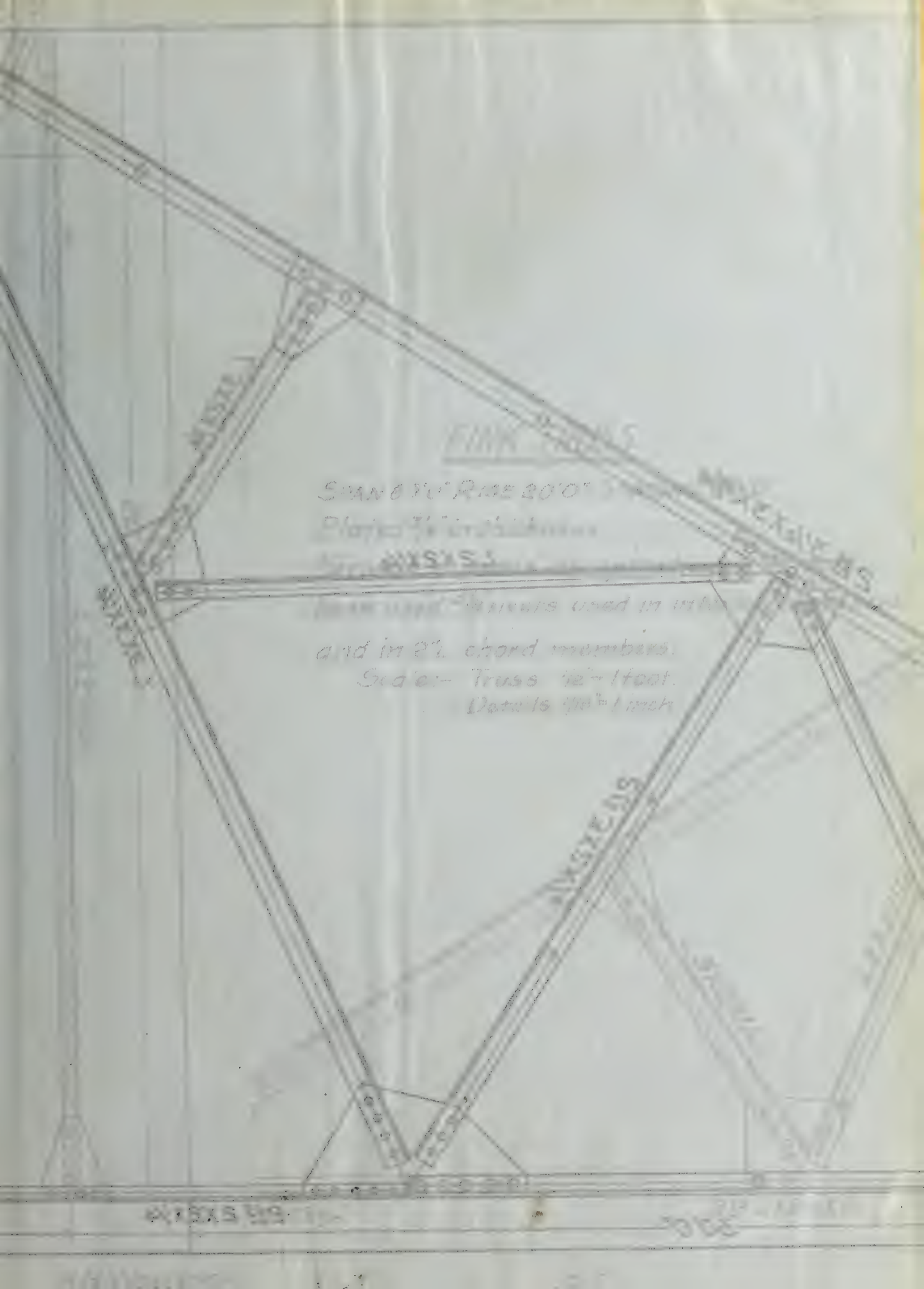
Scale :-

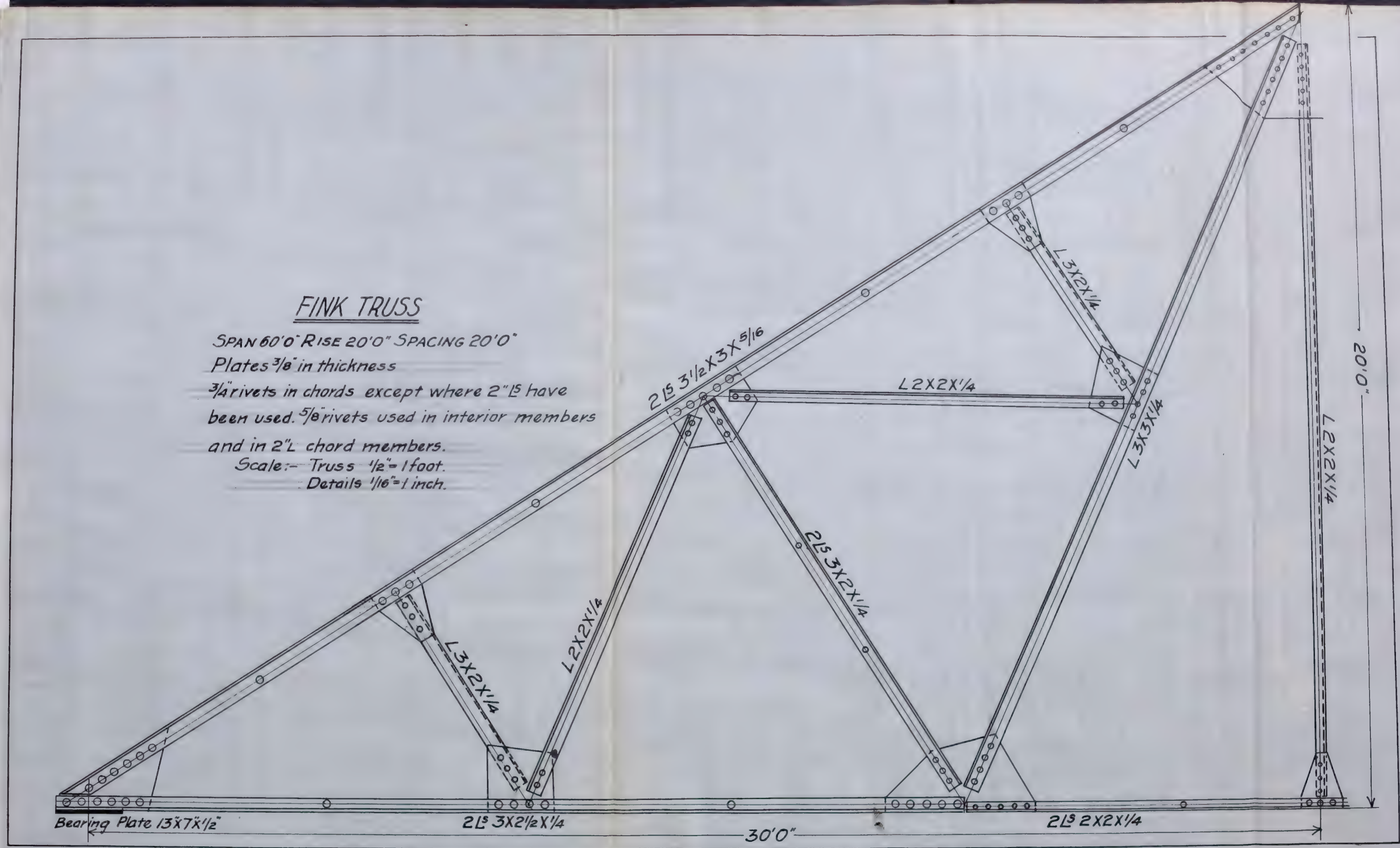
Truss — 1/2" = 1 foot

Details — 1/16" = 1 inch



H.H. WOLLESON.


FINK TRUSS
SPAN 60'0" RISE 20'0"
and in 2½ chord members.
Scale:- Truss ½" = 1 foot.
Details 1/16" = 1 inch


FINK TRUSS
SPAN 60'0" RISE 20'0" SPACING 20'0"
Plates 3/8" in thickness
3/4" rivets in chords except where 2" Ls have been used. 5/8" rivets used in interior members and in 2" L chord members.
Scale:- Truss 1/2" = 1 foot.
Details 1/16" = 1 inch.
2 Ls 3 1/2 X 3 X 5/16
L 3X2X1/4
L 2X2X1/4
L 3X3X1/4
L 2X2X1/4
2 Ls 3X2X1/4
L 3X2X1/4
L 2X2X1/4
20'0"
Bearing Plate 13"X7"X1/2"
2 Ls 3X2 1/2 X 1/4
2 Ls 2X2X1/4
30'0"

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HOWE TRUSS

SPAN 60'0" RISE 15'0" SPACING 14'0"

Plates 3/8" in thickness

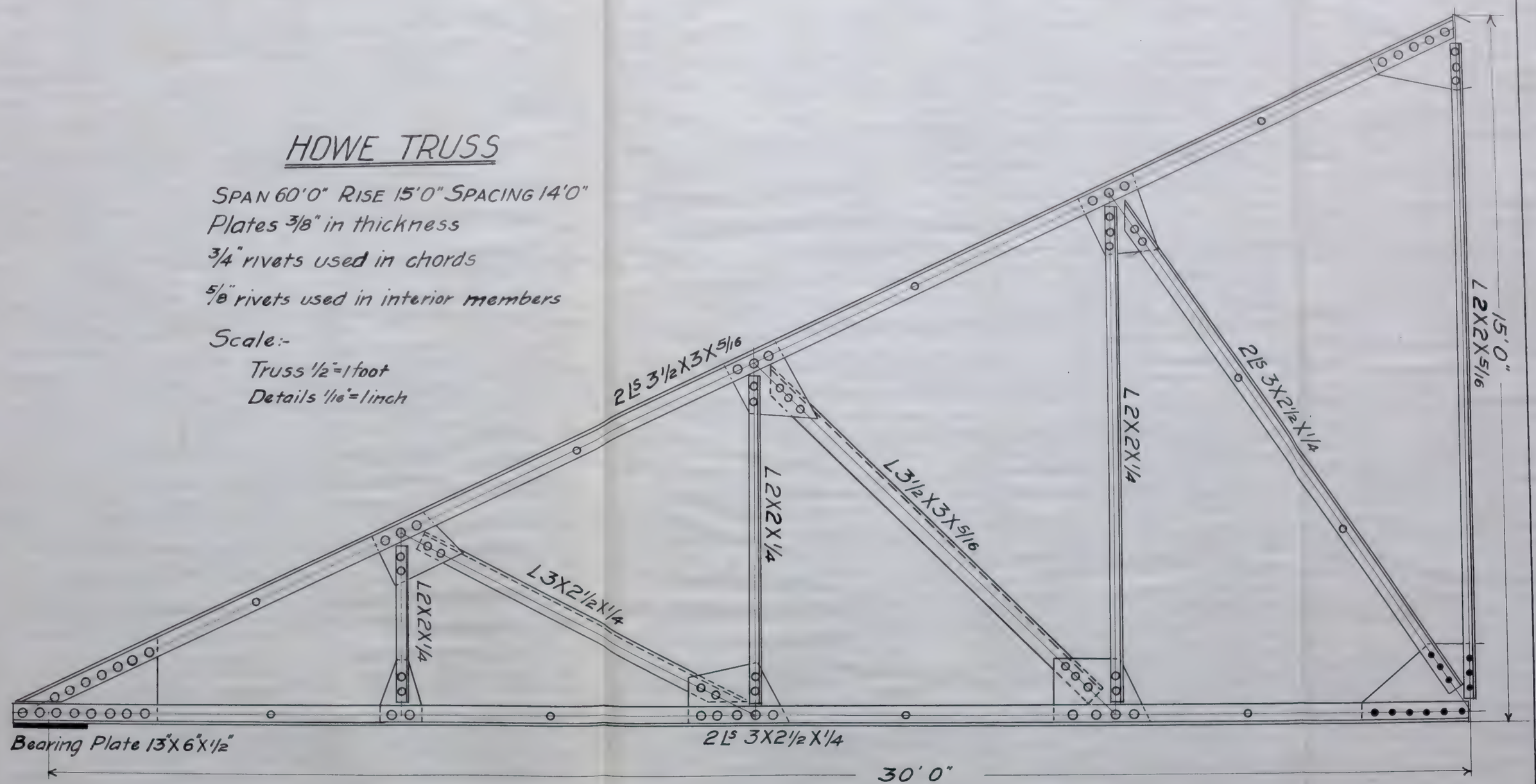
3/4" rivets used in chords

5/8" rivets used in interior members

Scale:-

Truss 1/2"=1 foot

Details 1/16"=1 inch



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